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ABSTRACT

The United States Department of Education's National Diffusion Network (NDN) assists public and private educational institutions in sharing exemplary programs, products, and processes. The staff development and teaching strategies offered by NDN projects are intended to renew and enhance elementary and secondary teachers' knowledge and approaches to teaching. This guide is a collection of 64 exemplary NDN programs in mathematics, science, and technology. Entries contain a description of the program, including grade level, content area, dominant instructional emphasis, curriculum scope, teacher training time required to adopt the program, types of follow-up or professional development offered to schools adopting NDN programs, costs, and contact information. (MKR)

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NATIONAL DIFFUSION NETWORK

Mathematics, Science & Technology Education Programs that Work

A Collection of Exemplary Educational Programs & Practices in the National Diffusion Network

ED 372 935

SE 054 275 Dup.

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Mathematics, Science, and Technology Education Programs that Work

A Collection of Exemplary Educational Programs and Practices in the National Diffusion Network

U.S. Department of Education
Office of Educational Research and Improvement
Programs for the Improvement of Practice

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National Diffusion Network

"The National Diffusion Network shall be a national program that recognizes and furthers excellence in education by promoting the awareness and implementation of exemplary educational programs, products, and practices to interested elementary, secondary, and postsecondary institutions throughout the Nation; and promoting the utilization of the knowledge, talents, and services of local staff associated with various educational excellence recognition efforts."

—Section 1562 of the Elementary and Secondary Education Act of 1965 as amended by the August F. Hawkins-Robert T. Stafford Elementary and Secondary School Improvement Amendments of 1988, Public Law 100–297.

Editor:
Luna Levinson
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January 1994

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Foreword

When I think of teachers across the nation, I am aware of the pressing need for professional development and models of exemplary programs and practices sufficient to guide students to new heights of learning. We believe that both teachers and students can benefit from the programs described in this guide.

The mathematics, science, and technology education programs in this booklet provide an array of innovative ideas for elementary and secondary teachers. Requests for this publication are high as, school by school, teachers continue their quest to increase student achievement in mathematics and science.

Along with this guide to exemplary programs, I am pleased to announce the publication of a companion volume of promising practices in mathematics and science education developed by the Office of Educational Research and Improvement's 10 Regional Educational Laboratories. The Laboratories' collection of programs emerged from a broad-based search, nomination, and rigorous review process reaching virtually every school district in the United States. Programs included in the Laboratories' publication are potential candidates for admission to the National Diffusion Network, demonstrating that compelling evidence of program effectiveness can be documented and replicated.

Our commitment in these dissemination efforts and all activities in the Department is to ensure equal *access* to education and to promote educational *excellence* throughout the nation. President Clinton's Goals 2000: Educate America Act is a comprehensive plan for reaching the national goals pledged by the President and the nation's Governors at the Education Summit in 1989. We hope your work and student achievement are enhanced by the practices suggested here.

Sharon P. Robinson
Assistant Secretary
Office of Educational Research and Improvement
U.S. Department of Education

Contents

Foreword iii

Introduction 1

How To Use This Guide 7

Mathematics, Science, and Technology Education Program Chart 9

Mathematics, Science, and Technology Education Programs 17

Academically Talented Youth Programs (ATYP), Mathematics 18

Academy of Finance 20

Calculator Assisted Mathematics for Everyday Living (CAMEL) 22

Careerways 2000 24

Chapter 1: Higher Order Thinking Skills Project (H.O.T.S.) 26

Comprehensive School Mathematics Program (CSMP) 28

Computer Assisted Diagnostic-Prescriptive Program (CADPP) 30

Computers Helping Instruction and Learning Development (Project CHILD) 32

Conceptually Oriented Mathematics Program (COMP) 34

Conservation for Children 36

Content Reading Including Study Skills (CRISS) 38

Coordinated Learning Integration—Middlesex Basics (CLIMB) 40

Cupertino Concept: Computer Literacy and Beyond Program 42

Decision-Making Math (DMM) 44

Developmental Approaches in Science and Health (DASH) 46

Diagnostic Prescriptive Arithmetic (DPA) 48

Effective Videodisc Instruction in Core Mathematics Concepts 50

First Level Mathematics (Kindermath) 52

Fish Banks, Ltd 54

FOR SEA: Investigating Marine Science 56

Foundational Approaches in Science Teaching: FAST 58

Geology Is 60

Hands-On Elementary Science 62

Help One Student To Succeed (HOSTS) Math 64

High/Scope K–3 Curriculum 66

Individualized Prescriptive Arithmetic Skills System (IPASS) 68

Informal Science Study (IFSS) 70

Investigating and Evaluating Environmental Issues and Actions 72

Iowa Chautauqua Program (ICP) 74

JEFFCO Middle School Life Science Program 76

Keyboarding, Reading, and Spelling (KRS) 78

Kindergarten Integrated Thematic Experiences (KITE) 80

Life Lab Science Program 82

Marine Science Project: FOR SEA 84

Mathematics Achievement Program (MAP) 86

Mathematics Achievement Through Problem Solving (MAPS) 88

Mechanical Universe: High School Adaptation 90

More Effective Schools/Teaching Project 92

National Faculty Teaching Project 94

Pablo Python Looks at Animals 96

Physics Resources and Instructional Strategies for Motivating Students (PRISMS) 98

Physics—Teach to Learn 100

Polar Regions 102

Precision Teaching Project 104

Project Career Awareness Program (Project CAP) 106

Relationships and Math-Friendly Physical Science (RAMPS) 108

Save For America 110

Science-Technology-Society: Issues and Solutions (STSIS) 112

Science-Technology-Society: Preparing for Tomorrow's World (PFTW) 114

Sci-Math 116

Skills Reinforcement Project (SRP) 118

Sound Foundations 120

Starwalk 122

Stones and Bones 124

Success Understanding Mathematics (SUM) 126

Successful Inservice Through Turnkey Education (SITE) 128

Systematic Teaching and Measuring Mathematics (STAMM) 130

Systems Approach to Individualized Instruction (SAII) 132

Team Accelerated Instruction (TAI): Mathematics 134

Title I Mathematics Computer Assisted Instruction (CAI) 136

Utilizing Computers in Teaching Secondary Mathematics (UCTSM) 138

Videodisc-Based Instruction in Core Science Concepts 140

Wildlife Inquiry Through Zoo Education (W.I.Z.E.) 142

Zoo Opportunities Outreach (ZOO) 144

Introduction

The U.S. Department of Education's National Diffusion Network (NDN) assists public and private educational institutions in sharing exemplary programs, products, and processes. Since its inception 19 years ago, NDN has grown from a small collection of federally funded programs to a storehouse of some 400 programs, spanning the core content areas and a host of cross-cutting topics including cognitive skills and schoolwide reform.

The momentum that led educators to believe effective programs can be successfully shared continues to sustain NDN. This simple idea works because of a validation system that recognizes persuasive evidence of program effectiveness while striving to ensure low-cost replication. What makes the spread of these programs from school to school so compelling is NDN's person-to-person dissemination system implemented by state facilitators, program developers, and locally based certified trainers.

Many mathematics, science, and technology education programs in NDN received developmental funding from the National Science Foundation (NSF). The Department is proud of the tradition of research and dissemination that is shared between these two federal agencies. Other programs were initially supported by state grants or university research efforts while some NDN programs began as tried-and-true ideas that worked for local classroom teachers. In all these cases, program developers submit to the U.S. Department of Education's Program Effectiveness Panel (PEP) (formerly the Joint Dissemination Review Panel, or JDRP) evidence of effectiveness in meeting program objectives and evidence that the program will meet educational needs in other settings.

As the number of mathematics, science, and technology education programs in NDN has grown, so has the spirit of reform taken over these fields of learning. Beginning in 1986, the consensus-building work of the National Council of Teachers of Mathematics (NCTM) led to the landmark document, *Curriculum and Evaluation Standards for School Mathematics* (1989), and in the same manner, *Professional Standards for Teaching Mathematics* (1991). These standards, serving voluntarily as a banner and a gauge for what all students should know and be able to do in mathematics, imply fundamental classroom changes. For example, classrooms are envisioned as mathematical communities where students and teachers work together, with teachers facilitating the students' problem solving and reasoning. More and more, students are encouraged to make mathematical connections to everyday life and to use manipulatives and experiments to build mathematical understanding.

Reform has also been embraced by key organizations in the scientific community. In the mid-1980s, the American Association for the Advancement of Science (AAAS) launched Project 2061 that published *Science for All Americans* (1989), a scientific literacy document describing learning outcomes for all students. One of the memorable messages of this work is the charge to integrate the subject-matter boundaries among mathematics, science, and technology. Another strong message emphasized in the National Science Teachers' Association's (NSTA) *Scope, Sequence, and Coordination Project* was to promote depth of scientific understanding rather than breadth of scientific facts. The task of bringing together all this work and more in support of nationwide systemic reform is now underway at the National Research Council in a project leading to national science education standards K–12.

What is remarkable about the current reform movement in mathematics and science education is the burgeoning link these fields share with advances in new information technologies. Just as computers and communication technologies have transformed the nature of scientific research and the workplace worldwide, so technology-based tools are revolutionizing students' and teachers' access to instruction and learning. For example, several NDN programs are on the cusp of such innovation with electronic networks that allow students and teachers to share messages about data collection in garden and biological laboratory work leading to more global understanding of environmental issues. (See Life Lab Program and Foundational Approaches in Science Teaching: FAST.) NDN programs represent a variety of educational applications of technology: networking, teaching and tutoring systems, learning environments that utilize workstations around microcomputers, computational tools, and exploratory uses of technology that provide guided discovery of concepts. (See H.O.T.S. Program.)

With the release of this guide to mathematics, science, and technology education programs that work, NDN encourages teachers and all educators to employ NCTM standards along with the benchmarks of Project 2061 and the emerging science standards in selecting curricula and practices. The staff development and teaching strategies offered by NDN projects are intended to renew and enhance teachers' knowledge and approaches to teaching.

A glimpse at several NDN program offerings reveals the depth of research development and field testing contributing to the successful implementation of NDN programs in diverse sites. For example, the Iowa Chautauqua Program, an inservice model designed to assist K–12 teachers in changing their goals, curricula, and teaching strategies, entered NDN in 1993 supported by a decade of research funding from NSTA and NSF as well as the Iowa Utility Association. Addressing the fact that many elementary teachers have little confidence in their ability to teach science and that their views of the nature of science are often erroneous, the Iowa Chautauqua Program seeks to increase teacher confidence and empower teachers to develop and assess new materials within the science-technology-society paradigm as defined by NSTA and as implied in the President's Goals 2000. The constructivist learning model, which emphasizes how every learner must formulate his or her own meaning, is basic to the instructional approach. The model operates with an annual sequence of training and teacher-support activities: a 2-week teacher leadership conference; a 3-week summer workshop for new teachers; and fall and spring short courses with extensive assessment. The Iowa Chautauqua Program has effected inservice offerings in Missouri, Kansas, Minnesota, Nebraska, and Wisconsin while teacher leaders from other states including Arizona, Oklahoma, Vermont, California, South Dakota, Pennsylvania and North Carolina have also participated in leadership training in Iowa.

Just as the Iowa Chautauqua Program uses a constructivist approach to address the reform of science teaching, so does another new NDN program, Developmental Approaches in Science and Health (DASH) use constructivist theory to confront more than 10 identified problems in science education. Designed as a comprehensive science, health, and technology program for grades K–3, DASH uses curricular time more efficiently by combining science and health content with the study of technology, which typically is not included in elementary programs. DASH nurtures the development of students' cognitive, kinesthetic, and interpersonal skills with activities designed to generate connections to what is already known, and thus uses new knowledge to expand children's understanding of the world. For example, the science component begins in kindergarten with studies of the natural history of the school environment, descriptive meteorology, and astronomy. Students observe the moon and find it goes through a regular sequence of phases in an almost constant number of days. First graders begin to observe the sun rise and set; they develop and use digital time and graph the length of day and night on the DASH learning calendar, a long roll of paper on which students record what they learn each day. Second graders identify solstices and equinoxes and relate these to the seasons. They develop the use of analog time, graph the rising and setting of the moon, and build a camera obscura to observe

the sun and eclipses. DASH professional development includes an initial 10-day institute, monthly meetings with a project-trained facilitator to refine instructional strategies, solve problems, and strengthen content knowledge. Developed with funding from NSF, the University of Hawaii, and the Hawaii Department of Business, Economic Development, and Tourism, DASH has been adopted by some 2,000 schools in 18 states and 2 foreign countries.

If this is an aggregate picture of an NDN program, what is the view inside a single school that has adopted an NDN program and successfully implemented NDN change? Consider the Life Lab Program, an applied science program emphasizing a hands-on, garden-based living laboratory approach to science education in grades 2–6. The program was admitted to NDN in 1986 with developmental funding beginning in 1979 under ESEA, Title IV–C, followed by additional support from the Packard Foundation, the California State Department of Education, and NSF. Life Lab's evidence of effectiveness shows that elementary students demonstrated significant gains in science achievement as evidenced by the California Test of Basic Skills Science Subtest and the SAT and MAT in science achievement. For 10 years, Life Lab has been an institution at the Robert F. Kennedy (RFK) Elementary School in San Jose, California. The community RFK serves is diverse, and many students are part of immigrant families. The story of how this program became institutionalized at RFK begins with district-level support from the superintendent and school principal along with initial support from enthusiastic and talented teachers. The school culture and Life Lab shared a commitment to cooperative learning. Project resources were broad based: community groups provided cash and in-kind donations; parents volunteered to work in the garden; Eisenhower State funds were used to train teachers; a school aide was assigned to the garden, and more sources of support were added to ensure the necessary resources. Life Lab teachers meet monthly to discuss success and problems as students record garden experiments in journals, make sketches and predictions of garden growth, and work together to measure plots, build support structures for plants, and maintain their gardens. Life Lab and the garden at RFK are schoolwide development projects that impact mathematics, journal writing, language development, and science education. The RFK garden, protected by a 12-foot-high fence, is an overwhelming source of pride in a school that has proclaimed:

> We try and make this school a safe oasis in the children's lives. We try and make (schooling) as positive an experience as possible. . .we emphasize both self-esteem and cooperative learning. . .and Life Lab is another part of our effort to provide these children with a good and ordered world. . .

In addition to the teachers at RFK, more than 5,700 educators have been trained in Life Lab's *Growing Classroom* curriculum in 29 states and the District of Columbia.

The integration of technology into elementary education is a subject that has raised the expectations of both educators and parents and given rise to some unprecedented successes in business and community support for schools. However, as growing numbers of schools across America add computers, software, and laboratories to the list of supplemental resources, scores of classroom teachers remain unprepared to utilize technology to improve instruction in core content areas. Project CHILD (Computers Helping Instruction and Learning Development) is a bold and visionary model for integrating computers with reading, language arts, and mathematics in grades K–5. By changing the underlying structure of the classroom setting and management, CHILD breaks the mold of placing the computer in the back of the classroom or simply adding technology to the layers of subjects taught. Rather, every teacher is a Project CHILD specialist, trained to use technology and hands-on techniques in one of three designated specialties . . . reading, language arts, or mathematics. Each teacher also provides social studies and science instruction. Students work with the same team of teachers for 3 years, either in a primary cluster (grades K–2) or in the intermediate cluster (grades 3–5). Classrooms

become learning resource rooms for 3 hours each day, focused on one of the three subject areas with students working at a variety of learning stations. A typical classroom has a computer station with three to six computers, a teacher station for small-group instruction, stations for hands-on activities, and stations for textbook-based and written work. The program provides teachers with suggested daily and weekly lesson plans, teaching strategies, and activity templates along with a structure for weekly team teachers' meetings as well as peer observation and coaching. Parent involvement includes an orientation with a classroom simulation and a video describing suggested home activities. After 3 years of implementing Project CHILD, the Wright Elementary School in Fort Walton Beach, Florida, boasts outstanding gains in student achievement. While the school is ranked in the bottom third in the school district overall, Project CHILD students in the school have ranked in the top third in the entire district. For example, the district average Comprehensive Test of Basic Skills (CTBS) percentile scores for mathematics in grades 3, 4, and 5 are 74, 73, and 69 while Project CHILD students' average at the Wright Elementary School were 84.3, 94.0, and 80.8. Moreover, two Project CHILD students were on the four-member school team winning the Toshiba ExploraVision National Award for technology exploration.

Along with the need to embrace technology in the pursuit of scientific literacy for all students, schools nationwide are increasingly concerned that students develop an understanding of the interactions of science, technology, and the environment. As the National Environmental Education Act (November 16, 1990) makes clear, "development of effective solutions to environmental problems and effective implementation of environmental problems requires a well-educated and trained, professional work force."

NDN offers a collection of environmental education programs emphasizing awareness, knowledge, and values in conjunction with citizen action, skills, and experiences. Science-Technology-Society: Issues and Solutions, the newest NDN program addressing environmental issues as well as other science-related social issues, is validated for grades 6, 7, and 8. This program has proven effective in changing the knowledge and skills in both science and social studies while increasing students' overt citizenship behavior. Another interdisciplinary middle school program in the NDN is Investigating and Evaluating Environmental Issues and Actions. The goals of this curriculum include developing students' information processing, problem-solving, and decision-making skills through such activities as inquiry writing, data collection in the local community, and data analysis. For teachers searching for a comprehensive curriculum in physical, biological, and earth sciences, Foundational Approaches in Science Teaching (FAST) offers students of all abilities in grade 7 rich opportunities in laboratory work with concepts such as ecology, energy use, and conservation. For students in grades 7–10, Wildlife Inquiry Through Zoo Education (W.I.Z.E.), integrates ecology issues with wildlife conservation by combining classroom activities with the scientific resources available at zoos. Each August, W.I.Z.E. offers a 1-week summer seminar attracting teachers nationwide to the Wildlife Conservation Park/Bronx Zoo in Bronx, New York. And for a supplemental environmental education program for grades 9–12 and college, Fish Banks, Ltd. is a computer-assisted simulation involving analytic reasoning, negotiation, and collective decision making. Students confront the long-term consequences of short-term strategies as they are challenged to operate a fishing fleet and design policies to maximize assets.

Physics for secondary students is a strength among NDN's science education program offerings. Teachers can choose from three distinct physics programs, or all of the offerings could be adopted by a single school seeking to develop a powerful and varied approach to physics concept exploration, development, and application. In fact, some NDN certified trainers or master teachers are prepared to train teachers in all three programs.

The Mechanical Universe High School Adaptation is a videotape-based conceptual development of topics in physics ranging from mechanics to electricity and magnetism and from special relativity to atomic physics. The interactive use of videotapes assists teachers in correcting common preconceptions and misconceptions. This project addresses the fact that many teachers with physics teaching assignments lack physics content preparation. Teachers can choose from 15- and 4-day workshops focusing on the instructional and academic competence of teachers. And so the program seeks to change what teachers understand about the physics concepts they teach and how they transmit their knowledge to students. Developed with funding from NSF, Mechanical Universe is disseminated by 37 certified trainers in 25 states. Another NSF-funded program, Physics Resources and Instructional Strategies for Motivating Students (PRISMS) places strong emphasis on student involvement in laboratory experiences. PRISMS provides discussion and indicators for laboratory performance assessment along with a computerized test (IBM and Macintosh) to assist teachers in student evaluation. Notably, the program provides a model for teaching the interaction of physics, technology, and society. Student gains in physics achievement are assessed with the New York Regents Physics Examination, the Test of Integrated Process Skills, and the Physics Attitude Index. Nationwide there are 70 PRISMS certified trainers, 10 percent of whom are Presidential Award Winners in Science Teaching. As a supplement to any physics instructional program, Physics—Teach To Learn provides computer simulations (Macintosh) which ask students to make judgments about physical events, often revealing misconceptions. Then, the teacher uses computer simulations to guide students through concept exploration, development, and application. Pre- and posttests indicate the level of student improvement in the instructional modules ranging from kinematics to simple harmonic motion to geometrical optics. Now adopted in 33 states, the program offers a 1- or 2-day training.

Of all the changes in mathematics content and emphasis proposed by NCTM, *Curriculum and Evaluation Standards for School Mathematics*, the most commonly accepted standard for grades K–4, 5–8, and 9–12 is mathematics as problem solving, especially as it relates to everyday life. What is suggested is not an old style of problem solving in which clue words are used as prompts for routine, one-step problems. Rather, the new vision of problem solving explores everyday problems, patterns, and relationships numerically, graphically, geometrically, symbolically, and verbally. In effect, doing mathematics is problem solving. It is exploring, describing, discussing, verifying, extending, representing, predicting, challenging, and applying. Several NDN mathematics programs are centered around such an enlightened view of problem solving.

The Comprehensive School Mathematics Program (CSMP) is a complete K–6 curriculum for making mathematics accessible, understandable, and enjoyable for all students. The approach underscores that students' mathematical understanding is developed out of problem-solving contexts. Constructivism, through a variety of experiences relevant to children's environment, is the core of instruction. CSMP also uses visual and pictorial images in a variety of teaching strategies. Opportunities for students to use mathematics in a connected way pervades this curriculum. For example, relationships and patterns are shown in number theory as well as in geometry, probability, and logical reasoning. The sequentially designed curriculum includes teachers' guides with suggested student-teacher dialog, student materials and activities incorporating the use of manipulatives as well as minicomputers, calculators, and geometry tools. CSMP is currently being used in 37 states and more than 500 sites including public schools districts and individual private schools.

NDN also features two professional development programs to improve elementary mathematics instruction in grades 2–6. Success Understanding Mathematics (SUM) was first designed to increase the level of mathematics achievement of children performing below expectation. During the program training, teachers learn strategies for using concrete objects in teaching numeration, addition and subtraction, multiplication and division, fractions, problem solving, and decimals. The goal of

Successful Inservice Through Turnkey Education (SITE), is to increase teachers' mathematical knowledge and enhance teaching practice. Teachers learn to use a problem-solving approach to mathematics incorporating manipulatives in a cooperative-learning setting. All trained teachers implement the program with students using the easily replicable workshop activities.

New to NDN in 1992 from Purdue University's School Mathematics and Science Center is Mathematics Achievement Through Problem Solving (MAPS), a full-year curriculum for general mathematics students, typically in grade 9. The program is designed to replace secondary school general mathematics courses that recapitulate the previous 8 years of mathematics with an overwhelming focus on computational skills. Moreover, MAPS addresses the lack of success that typifies many general mathematics students with poor attitudes toward mathematics, little motivation, and low self-esteem. In MAPS, the teacher has a new role as facilitator rather than disseminator. To prepare for this new role, teachers participate in an intensive 5-day workshop to construct an understanding of collaborative learning, the problem-centered curriculum, the MAPS philosophy of learning, and the classroom social environment needed to use the MAPS program. All students are given opportunities to develop mathematical concepts and use higher order thinking skills while the curriculum consists of activities that promote students' construction of mathematical concepts. Calculators and computers are used as problem-solving tools. Finally, MAPS teachers use alternative assessment measures such as observation and questioning of individual students while they work, student self-assessments, peer assessments, and holistic scoring.

Choosing one or more NDN programs can begin the process of school and districtwide reform in mathematics, science, and technology education. The rewards of adopting an exemplary, validated program can be measured in increased student achievement, improved student attitudes toward academic content, and enhanced teacher knowledge and practices. Such gains bind our schools, communities, and states in responding to the mathematics and science challenges of National Education Goals 3 and 4.

How To Use This Guide

To assist in selecting programs that address a variety of audiences and instructional priorities, this guide includes a chart of program characteristics found on pages 9–15. The chart summarizes the following categories of program information: grade level addressed by the curriculum; principal content area; dominant instructional emphasis for each program; scope or dimension of the curriculum; teacher training time required to adopt the program; and types of follow-up or professional development offered to schools adopting NDN programs.

For the "instructional emphasis" category, only the central instructional focus has been selected for each program although most incorporate a variety of instructional practices. Choices abound. Within this category, some programs are described as inquiry-based which is to say students engage in problem solving and construct their own solutions to problems. Other programs are best described as hands-on programs which means that learning derives from students' direct observation and experimentation with materials from everyday life. Programs can also be described as technology-delivered, signaling the use of videotapes, video discs, or computers as the primary practice.

Instructional focus can fuse even more approaches. Interdisciplinary programs connect the essential elements of one content area to another so as to enhance comprehension of the disciplines. Staff development programs emphasize the development of teachers' knowledge of content areas and do not necessarily incorporate student curriculum. Basic skills programs promote an understanding of number and computation while critical thinking programs encourage inquiry and show students how to interpret and evaluate information and to draw inferences from ideas. Programs emphasizing cooperative learning seek to develop strategies and cooperative group work. And diagnostic and prescriptive programs are developed with the belief that what students know determines the foundation for teachers' instructional practice.

"Curriculum scope" specifies the parameters of the materials. For example, some programs are comprehensive because they are designed to fulfill the entire instructional program in a content area for a complete school year. By contrast, modular curricula are typically organized into thematic units that can be integrated into existing curricula. Supplemental programs are developed around one or more related activities; they are designed to enhance existing instructional programs.

Most programs in this guide feature a full-page description, signifying these programs are engaged in broad dissemination and adoption activities. In selected cases, an illustration of the program's curriculum or a sample of student work supplements the description. Choosing programs and negotiating the cost of training is made easier by NDN's system of state facilitators. Federal funds support facilitators (one in every state, the District of Columbia, Puerto Rico, and the Trust Territories, as well as a private school facilitator) who link NDN exemplary programs with educators seeking new programs and practices. In some states, the NDN facilitator works within the State Department of Education, and in other states the NDN facilitator operates from a private, nonprivate corporation, university, or a regional educational agency. A separate list of NDN state facilitators is enclosed.

Beyond working with teachers and schools in selecting individual NDN programs, state facilitators can suggest routes to a number of funding sources that can be used to adopt NDN programs. One of

the largest federal sources available to all public and private elementary and secondary schools for the support of teacher inservice in mathematics and science education is the State Eisenhower Mathematics and Science Program. Designed as a formula grant program to the states with flow-through money to local education agencies, the Eisenhower Program gives states and local educators broad discretion in addressing professional opportunities for educationally disadvantaged students and Chapter 2 funds to promote quality innovation in education. Having explored these possibilities and other support opportunities in the U.S. Department of Education's Regional Educational Laboratories, institutions of higher education, and local school districts, NDN state facilitators are prepared to share their knowledge of how to improve mathematics, science, and technology education for students and teachers.

Mathematics, Science, and Technology Education Program Chart

Mathematics, Science, and Technology Education Program Chart

Program	Grades	Content	Instructional Emphasis	Curriculum Scope	Training Days	Professional Development
Academically Talented Youth Programs, Mathematics (ATYP)	7-9	Algebra I, II Probability, Trigonometry	Conceptual/Theoretical	Comprehensive		
Academy of Finance	11-12	Economics and Financial Services	School/Business Partnership	Modular	2	Team site visits
Calculator Assisted Mathematics for Everyday Living (CAMEL)	9-10	Mathematics	Basic Skills/Tech-Delivered	Modular	1	
Careerways 2000	8-12	Art/Media/Science	Problem Solving	Modular	1	
Chapter 1: H.O.T.S. Higher Order Thinking Skills Project	4-6 Chapter 1	Mathematics, Reading	Inquiry-Based/Tech-Delivered	Modular	5	Toll-free telephone, curriculum updates
Comprehensive School Mathematics Programs (CSMP)	K-6	Mathematics	Inquiry-Based/Hands-On	Comprehensive	2-5	Newsletter, on-site visits, e-mail, telephone contact
Computer Assisted Diagnostic Prescriptive Program (CADPP)	3-9 Chapter 1	Mathematics/Reading	Basic Skills	Supplemental	1	
Computers Helping Instruction and Learning Development (Project Child)	K-5	Technology Integrated Reading, Mathematics, Language Arts	Inquiry-Based/Tech-Enhanced	Comprehensive	3	On-site assistance, newsletter, conferences, toll-free telephone
Conceptually Oriented Mathematics Program (COMP)	1-8 Chapter 1	Mathematics	Basic Skills/Problem Solving	Modular		On-site workshops, telephone monitoring
Conservation For Children	1-6 Chapter 1	Environmental Education	Basic Skills Practice	Supplemental	1	Teleconference, site visits, telephone and mail monitoring
Content Reading Including Study Skills (CRISS)	4-12	Reading, Study Skills, Learning Strategies	Staff Development, Basic Skills, Interdisciplinary	Supplemental	2	Site follow-up visits, newsletter, telephone monitoring, computer network
Coordinated Learning Integration—Middlesex Basics (CLIMB)	K-12 Chapter 1	Reading, Writing, and Mathematics	Hands-On, Diagnostic/ Prescriptive	Comprehensive	1-2	On-site visits, video, follow-up training

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Program	Grades	Content	Instructional Emphasis	Curriculum Scope	Training Days	Professional Development
Cupertino Concept: Computer Literacy and Beyond Program	K-8	Technology-Integrated Curriculum	Staff Development/ Tech-Delivered	Modular	1	
Decision-Making Math (DMM)	7-9	Mathematics	Inquiry-Based/Problem Solving	Supplemental	1	Newsletter, workshop, telephone monitoring, annual conference
Developmental Approaches in Science and Health (DASH)	K-3	Science/Health/ Technology	Inquiry-Based	Comprehensive	10	Teleconference, computer network, site visits, newsletter
Diagnostic Prescriptive Arithmetic (DPA)	3-5	Mathematics	Hands-On	Supplemental	2	Site visits, telephone monitoring
Effective Videodisc Instruction in Core Mathematics Concepts	5-7	Mathematics	Basic Skills/Tech-Delivered	Modular	1	
First Level Mathematics (Kindermath) (Available in Spanish)	K-1	Mathematics	Hands-On	Comprehensive	1	Toll-free telephone, video training tape
Fish Banks, Ltd. (Available in Spanish and 5 other languages)	9-12	Environmental Education	Inquiry-Based/Tech-Delivered	Supplemental	1	Newsletter, telephone monitoring, summer institute, videos, bilingual certified trainer
FOR SEA: Investigating Marine Science	1-6	Marine Science	Hands-On/Interdisciplinary	Comprehensive Modular	1	
Foundational Approaches In Science Teaching (FAST) (Available in Braille, Russian, Slovak)	7	Physical, Biology, and Earth Science	Inquiry-Based	Comprehensive	10	Renewal workshops teleconf., compt. netwk, newsletter, site visits
Geology Is	9-12	Geoscience	Reading/Inquiry-Based/ Tech-Delivered	Comprehensive/ Modular	1	Regional geoscience update
Hands-On Elementary Science (Available in Spanish)	1-5	Science Process	Hands-On	Modular	2	Teleconference, on-site visits, bilingual certified trainers

Program	Grades	Content	Instructional Emphasis	Curriculum Scope	Training Days	Professional Development
Help One Student to Succeed (HOSTS) Math	1-8	Remedial Mathematics	Diagnostic/Prescriptive	Modular	3	
High/Scope K-3 Curriculum	K-3 Chapter 1	Mathematics, Science, Language Arts	Problem-Solving, Hands-On, Cooperative Learning	Comprehensive	2	On-site follow-up newsletter (Spanish and English)
Individualized Prescriptive Arithmetic Skills System (IPASS)	5-6	Mathematics/Technology	Tech-Delivered	Modular	1	
Informal Science Study (IFSS)	5-12	Physical/Biological	Inquiry-Based	Modular	1	Telephone monitoring; on site-visits
Investigating & Evaluating Environmental Issues and Actions (IEEIA)	7-8	Environmental Education; Science, Social Studies, Language Arts	Inquiry-Based, Interdisciplinary	Modular	5	Telephone monitoring; on-site visits
IOWA Chautauqua Program	K-12 Chapter 1	Physical Science/Staff Development	Inquiry-Based/Problem Centered	Modular	21	Summer leadership conference, newsletter, computer network, telephone monitoring, on-site visits.
JEFFCO Middle School Life Science Program	7-8 Chapter 1	Life Science	Inquiry-Based Text	Comprehensive	5	National and on-site workshops
Keyboarding, Reading, and Spelling (KRS)	1-6 Chapter 1	Computer Usage, Keyboarding, Reading, Spelling	Basic Skills/Tech-Delivered	Supplemental/ Comprehensive	1	Newsletter, state and national conferences, on-site visits, telephone monitoring
Kindergarten Integrated Thematic Experiences (KITE) (Spanish materials)	K Chapter 1	Mathematics/Reading	Hands-On/Inquiry-Based, Basic Skills	Comprehensive	1-2	Newsletter, on-site visits bilingual certified trainer
Life Lab Science Program	2-6	Science Process/Gardening	Hands-On	Modular	2	
Marine Science Project: FOR SEA	7-12	Marine Science	Hands-On/Interdisciplinary	Comprehensive/ Modular	1	
Mathematics Achievement Program (MAP)	2-5 Chapter 1	Mathematics	Basic Skills/Diagnostic	Modular		
Mathematics Achievement Through Problem Solving (MAPS)	9	General Mathematics	Inquiry-Based/Tech-Delivered	Comprehensive	5	

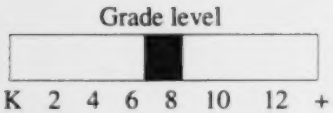
Program	Grades	Content	Instructional Emphasis	Curriculum Scope	Training Days	Professional Development
Mechanical Universe: High School Adaptation (Available in Spanish)	9-12	Physics	Reading Based/Tech-Delivered	Modular	4	Toll-free telephone, newsletter
More Effective Schools/ Teaching Project	K-12	Reading, Mathematics, and Science	Problem Solving, Planning Teams	Modular		
National Faculty Teaching Project	1-12	Mathematics, Science, Humanities	Varied	Comprehensive		
Pablo Python Looks at Animals (Spanish Materials)	K-3	Life Science	Hands-On/Interdisciplinary	Modular	1-2	Toll-free telephone, supplemental materials
Physics Resources and Instructional Strategies For Motivating Students (PRISMS)	12	Physics	Inquiry-Based/Tech-Delivered	Comprehensive	3-5	Videos of model teaching
Physics - Teach to Learn	12	Physics	Inquiry-Based/Tech-Delivered	Supplemental/Modular	1-2	Newsletter, telephone monitoring
Polar Regions	5-8	Meteorology, Oceanology, Geology	Inquiry-Based/Tech-Delivered	Modular	1	
Precision Teaching Project	K-4	Math/Reading/Spelling	Basic Skills, Diagnostic-Prescriptive	Modular	2	
Project Career Awareness Program (PROJECT CAP)	K-6	Reading, Mathematics, and Science	Basic Skills, Careers	Modular	1	Follow-up consultation
Relationships and Math Friendly Physical Science (RAMPS)	8-9	Physical Science	Hands-On/Inquiry/Reading	Comprehensive	1-3	Toll-free telephone, newsletter
Save for America (Spanish materials)	4-6	Mathematics/Social Studies	Hands-On/Business Partnership	Supplemental	1	Newsletter, national conference
Science-Technology-Society: Issues and Solutions	6-8	Science/Social Studies	Inquiry-Based	Modular	5	Telephone monitoring/ on-site visits
Science-Technology-Society: Preparing for Tomorrow's World	7-12	Science, Technology, Social Studies	Inquiry-Based Simulations	Comprehensive/Modular	1-2	On-site visits, telephone and mail monitoring

Program	Grades	Content	Instructional Emphasis	Curriculum Scope	Training Days	Professional Development
Sci-Math	7-12	Mathematics/Science	Inquiry-Based/Hands-On	Supplemental	1	On-site workshops, newsletter, telephone monitoring
Skills Reinforcement Project (SRP)	5-8	Mathematics	Basic Skills	Comprehensive		
Sound Foundations	8-12	Mathematics	Basic Skills	Modular	1	On-site workshops
Starwalk	3-4	Earth/Space Science	Reading Based/Hands-On	Modular	2	
Stones and Bones	7-12 Chapter 1	Life Science/Biology Anthropology	Hands-On /Interdisciplinary	Modular	1	Follow-up sessions
Success Understanding Mathematics (SUM)	2-6 Chapter 1	Mathematics	Hands-On/Inquiry-Based	Comprehensive	1-2	Telephone consultation, follow-up inservice
Successful Inservice Through Turnkey Education (SITE)	2-6 Chapter 1	Mathematics/Teaching Strategies	Strategic Hands-On/Inquiry-Based	Modular	3-5	Newsletter, on-site visits, e-mail, telephone monitoring
Systematic Teaching and Measuring Mathematics (STAMM)	K-8	Mathematics	Diagnostic/Hands-On	Comprehensive	1-2	Newsletter, telephone monitoring, on-site visits
Systems Approach to Individualized Instruction (SAII)	1-6	Reading/Mathematics	Diagnostic/Basic Skills	Modular	1-3	
Team Accelerated Instruction (TAI): Mathematics	3-6 Chapter 1	Mathematics	Cooperative Learning	Comprehensive	2	Telephone conferences, on-site visitation, follow-up sessions
Title I Mathematics Computer Assisted Instruction (CAI)	3-6	Remedial Mathematics	Diagnostic/Prescriptive	Supplemental	2	
Utilizing Computers In Teaching Secondary Mathematics (UCTSM)	9-12	Algebra I-II, Probability, Trigonometry	Basic Skills/Tech-Delivered	Modular	1	
Videodisc-Based Instruction in Core Science Concepts	8-12	Physical Science	Basic Skills/Tech-Delivered	Modular	1	
Wildlife Inquiry Through Zoo Education (WIZE)	7-9	Life and Environmental Science	Inquiry-Based	Modular	2, 3, 5	Toll-free telephone, supplemental materials, follow-up training
Zoo Opportunities Outreach (ZOO)	K-6	Animal Studies	Reading/Activity-Based	Modular	1	

Mathematics, Science, and Technology Education Programs

Academically Talented Youth Programs (ATYP), Mathematics

A program of accelerated instruction in mathematics for junior high school students with exceptional mathematical ability.



Description

This program is approved by JDRP for academically gifted students in grades 7–8 who have obtained a score of 500 or better on the mathematics portion of the Scholastic Aptitude Test (SAT); a score of 870 or better on the mathematics plus verbal section. It provides accelerated mathematics instruction for students in grades 7–9 with excellent mathematical ability.

The collaboration between K–12 school districts and higher education institutions permits the program to identify students with exceptional ability in public and nonpublic school districts and provide them with accelerated instruction at a higher education institution. The first year of the program covers the standard 2-year high school algebra curriculum of Algebra I and Algebra II, plus introductory work in probability and trigonometry. Instruction, often by college and university professors, occurs in a two-and-a-half-hour class weekly during the school year and emphasizes the conceptual and theoretical framework of mathematics.

The class is composed of a homogeneous group of students of the same age and ability. Course grades and high school credit recommended by the instructor are granted by the home school.

Services

- Awareness materials are available at no cost.
- Visitors are welcome at the program site by appointment.
- Program staff are available for awareness sessions (costs to be negotiated).

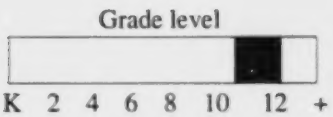
Contact

Carol R. McCarthy
Director, Academically Talented Youth Programs
Mathematics
Kalamazoo College
1200 Academy Street
Kalamazoo, MI 49007
616–383–8550 or 383–8468

Developmental funding: Private foundations
JDRP No. 86–9 (6/25/86)

Academy of Finance

An intensive 2-year academic and work experience program designed to prepare high school students for entry-level careers in financial services.



Description

For students from comprehensive high schools who have average or better academic and attendance performances, this is a highly structured academic and work experience program. It offers a viable option for students lacking concrete career plans or interests; an avenue for career preparation in financial services; opportunities for women and minorities to gain access to careers in a nontraditional field; and a substantive approach for involving businesses in preparing youth for entry-level jobs. The program supplements the existing curriculum and consists of seven courses that are finance or finance-related plus a college-level finance course, a 7-week paid summer internship at a financial services firm between the student's junior and senior years, and participation in finance-related activities (e.g., annual conference, speakers, and tours). Participation in the program prepares students for productive employment by stressing communication skills, analytic thinking, and workplace basics such as dress, punctuality, and cooperativeness.

Evidence from multiple sources support claims that youth who participate in the program are knowledgeable in finance and economics and its application; are better prepared for employment in entry-level positions than existing entry-level employees; have a higher graduation rate than their respective high schools; and pursue financial services through college and employment. Female and minority students persist in the program and are more likely to go to college and major in financial services than others, as likely to be employed in financial services as others, and to go further in the financial services field than is typical for this group. The Academy of Finance is approved by PEP for students in grades 11–12 from comprehensive high schools who have average or better academic and attendance performances.

Requirements

A 6-month start-up period for planning and teacher training is recommended. A start-up guide, curriculum materials, and extensive technical assistance, training, and support are provided. A school district is required to support continuous teacher training in financial services (e.g., the National Academy Foundation's annual staff development conference) and provide additional professional development activities developed with the local advisory board.

Costs

Start-up and ongoing operations are dependent upon shared financial and other support from the participating school district and local business sponsors. The first year's shared costs for nonpersonnel expenditures are estimated at $26,000, including a $4,000 adoption fee (for curriculum, support materials, newsletters, directory training, and technical assistance in perpetuity), and covers teacher training, materials, special events, three director's conferences, and miscellaneous costs.

In addition, the school and business partnership negotiates the sharing of costs for the full-time program director's and administrative support salaries. The district budgets for teachers' salaries; business sponsors budget for paid internships and on-site teacher training; and the local higher education institution contributes tuition for the college course.

Services

- Training, curriculum, and support materials.
- A technical assistance team visits new sites during the start-up phase.
- New sites participate in ongoing training activities (e.g., annual staff development and regional conferences).

Contact

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New York, NY 10003
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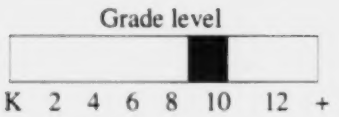
Developmental funding: Shearson Lehman/American Express, Primerica, and local
PEP No. 91–11 (3/19/91)

Calculator Assisted Mathematics for Everyday Living (CAMEL)

A curriculum to increase the computation and application skills of general mathematics students.



Description

CAMEL is an individualized 2-year program for those general mathematics students who have had little or no success in mathematics. These students usually have computational deficiencies that preclude their mastering many of the "living skills" concepts that are part of everyday life for most people. The program is based on the premise that these students can and will learn these concepts if the amount of computations is reduced.

Students use calculators to perform the computations necessary to learn and apply these concepts. Paper-and-pencil computations are not excluded by use of the calculator. Included are eight computations modules that the students must work using paper and pencil if they cannot demonstrate mastery of the skill on a pretest. Paper-and-pencil computations should take less than 20 percent of the students' time. While CAMEL was developed for use in a regular classroom and is primarily used there, the individualized nature of the program makes it appropriate for any group that is highly transient and not well-motivated.

Requirements

The CAMEL program can be used by any mathematics teacher. The teacher-student ratio is 1/30. A 1-day training session is desirable but not necessary. Each student in the program should have access to a calculator. A set of CAMEL materials is required and consists of eight computational modules, 31 applications modules, and two applications review modules; teacher and manager manuals; and a complete set of pre- and posttests with answer key. A management system to help the teacher is also part of the program.

Contact

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Project CAMEL
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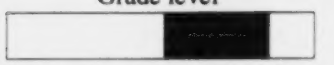
Developmental funding: USOE ESEA Title IV–C
JDRP No. 82–5 (2/17/82)

Careerways 2000

A program to focus students' attention on more skills, attitudes, and abilities to afford them the widest variety of educational opportunities and career options in the future.

Grade level



Description

The program will help students of all abilities to be more keenly aware of what they need to be successful in both their academic world today and the work-a-day world tomorrow. The newly revised curriculum package features six motivational 30-minute videotapes, each focusing on an identified cluster of careers. Accompanying the videotapes is the *Careerways 2000 Teacher's Guide*, divided into seven instructional units, each containing many student activities. Each activity contains a lesson plan, necessary teacher background materials, and student worksheets.

The first unit, containing sixteen activities, helps students to focus their thinking on key aspects of the decision-making process. Each of the next six career cluster units includes an overview, highlights of the video program corresponding to that unit, suggested discussion topics, a vocabulary list, a sample list of careers in the field, and an interest survey for students. All seven units help students grow in their ability to utilize planning, organizing, and critical-thinking techniques in the decision-making process. The six career cluster areas covered by the program's videotapes encompass the arts, business and finance, industry, the media, service, science and technology.

The videotapes (available in opened caption) focus on the personal stories of women and men who tell how they identified their goals, used organizing and planning skills to meet their educational challenges and to succeed in their chosen areas of endeavor. These role models are seen "up close" as they perform within their work environments and interact with their fellow workers. As students take an in-depth look at the specific careers being spotlighted, the stories of the role models reinforce and enhance the program's primary goal.

The program can be used as a self-contained career education course of study or as a unit in a specific subject content area using the *Careerways 2000 Teacher's Guide* as a text. It can also be used as a school-wide career education program tracked into appropriate subject content area classrooms related to the career cluster areas under consideration.

Careerways 2000 addresses the National Goals for Education, specifically that students and adults demonstrate competency in challenging subject matter and are able to compete in the workplace. The program is most appropriate for those audiences seeking emphasis on decision-making and communication skills, gender equity, at-risk, and infusion of vocational education and academics (Carl Perkins). It is approved by PEP for students of all abilities in grades 8–12.

Requirements

The teacher must have a one-half inch VHS videocassette player and a large-screen television set. A 1-day teachers' training workshop is recommended.

Costs

Curriculum materials are available for $450 for a set of six videotapes and the *Careerways 2000 Teacher's Guide*. Additional copies of the guide and the individual videotapes may be purchased separately at $75 each.

Services

- Awareness materials are available at no cost.
- Program staff are available to attend awareness conferences or to conduct program training at the site of the requesting agency. (Trainer's per diem and travel costs to be negotiated.)

Contact

Jerry McLeroy, Disseminator
Los Angeles Unified School District
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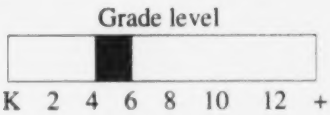
Los Angeles, CA 90017
213–625–6695 or 213–625–6681

Developmental funding: ESEA, Title IV
PEP No. 81–31R2 (3/28/91)

CHAPTER 1: Higher Order Thinking Skills Project (H.O.T.S.)

An alternative approach to Chapter 1 in which compensatory services consist solely of higher order thinking activities.



Description

This program replaces traditional drill and practice activities and content instruction in compensatory programs with thinking activities designed to generate the gains in basic skills expected from Chapter 1 programs. Students' thinking abilities and social confidence are improved in the process. The goal is to provide students with conceptual skills to learn the more sophisticated content of the upper elementary grade levels the first time it is taught in the classroom.

The program is conducted in a lab equipped with Apple computers (Apple IIe, Apple IIgs, or Macintosh LC), with a detailed curriculum and a teacher trained in Socratic dialog techniques. Computers are used to enhance motivation and improve students' ability to monitor their own comprehension. A detailed curriculum provides dialogs to improve the key thinking skills of metacognition, inference from context, decontextualization, and information synthesis. Students' increased abilities to articulate ideas and engage in sophisticated conversations enhance their language use and ability to learn content, with gains in both reading and mathematics.

The program operates as a pull-out. Students are in the program for 35 minutes a day, 4 days a week, for 2 years. In the first part of the period, the teacher engages students in sophisticated conversations. Students are then given a challenge to solve using the computer. They later discuss their findings, approaches, and results. Teacher judgment determines the pace through the curriculum. Success is demonstrated by products generated by each student, how they articulate their findings, and the results they record.

H.O.T.S. directly addresses Goal 3 (Student Achievement and Citizenship). Activities are specifically designed to increase cognitive development in ways that will transfer to gains in basic skill achievement, thus meeting the following Goal 3 objectives: academic performance of elementary and secondary students will increase significantly and students [will] demonstrate the ability to reason, solve problems, apply knowledge, and write and communicate effectively.

As a result of participation, Chapter 1 students in grades 4–6 improved their performance in reading and mathematics to a greater extent than national averages and control groups while also improving thinking ability as measured by the ROSS and "Inference from Context" measures. Improved self-concept and improved participation in content learning in the classroom were also evident. Studies were conducted in 11 schools encompassing a wide range of ethnic characteristics. H.O.T.S. is approved by PEP for Chapter 1 students in grades 4–6 in both reading and mathematics. It has also been used successfully with Chapter 1 students in grade 7, learning disabled in grades 4–6, and gifted in grades K–2.

Requirements

The program requires a computer lab, using Apple IIe, IIgs, or Macintosh LC computers and an experienced teacher who is trained in Socratic coaching techniques. A week-long workshop is provided to train teachers in these techniques.

Costs

Training, 2-year curricula, and first year support costs are a total of $1,500 for the first teacher trained at a school site. Each additional teacher trained for that school is $600. Annual support fees (including program research telephone support, newsletters, curriculum, and videotape updates) are $100/school.

Services

- Awareness materials are available at no cost.
- Project staff is available to attend out-of-state awareness meetings and for training and technical assistance (costs to be negotiated).

Contact

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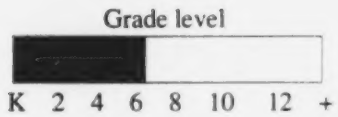
University of Arizona
College of Education
Tucson, AZ 85721
602–621–1305 FAX 602–621–9373

Developmental funding: U.S. Department of Education and Ford Foundation
PEP No. 88–12 (7/13/88)

Comprehensive School Mathematics Program (CSMP)

A complete elementary-level math curriculum from basics to problem solving for students of all ability levels.



Description

An assumption of CSMP's curriculum is that children can learn and enjoy learning much more mathematics than they do now. The content is presented not as an artificial structure external to children's experiences but rather as an extension of those experiences, both at real-life and fantasy levels. Using a "pedagogy of situations," children are led through problem-solving experiences presented in game-like, story settings. CSMP's strong conviction is mathematics is a unified whole and should be learned as such. Consequently, the content is sequenced in spiral form so students are brought into contact with each content area continuously throughout the program while building interlocking experiences of increasing sophistication as the situations become more challenging.

CSMP's unique feature is the use of nonverbal languages that give children immediate access to mathematical ideas and methods necessary not only for solving problems but also for continually expanding their understanding of the mathematical concepts themselves. Through these languages, the curriculum engages children immediately and naturally with mathematics and its applications without cumbersome linguistic prerequisites. Tools such as the Papy Minicomputer, the hand-held calculator, various geometry tools, and random devices are used extensively throughout the curriculum to pose problems, explore concepts, develop skills, and define new ideas. The program is approved by JDRP as a complete mathematics curriculum for students of all abilities, grades K–6.

Requirements

School systems and CSMP agree on an implementation plan that provides for the training of teachers, the evaluation of the program, and support services. The school system appoints a local

coordinator who maintains contact with CSMP as a member of the CSMP Network.

Services

- Awareness materials are available at no cost.
- With advance notice, arrangements can be made for visitors to observe the program in a variety of sites.
- Program staff are available to attend out-of-state awareness meetings.
- Training is conducted at the program or the adopter site.
- Implementation and follow-up services are available to adopters.

Contact

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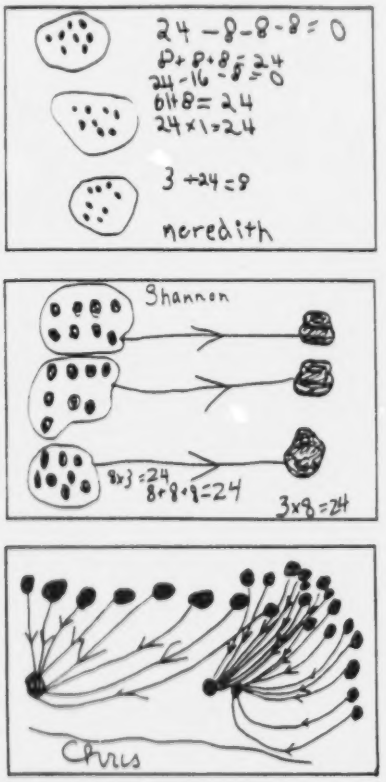
Aurora, CO 80014
303–337–0990

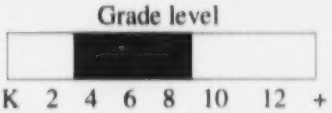
Developmental funding: USOE ESEA Titles III and IV and National Institute of Education
JDRP No. 78–169R (3/17/78) Recertified 4/6/92



First grade students' responses to the following problem: "I have 24 bottles of soda. I want to put them into cartons with 8 bottles in each carton. How many cartons do I need?"

Computer Assisted Diagnostic-Prescriptive Program (CADPP)

A computer-managed program that generates educational plans as the basis for a diagnostic-prescriptive approach to instruction.



Description

This relational database software program provides an alternative for teachers who manually prepare individual student prescriptions by automating the task of preparing Individualized Educational Plans (IEPs). CADPP was developed for administrators, teachers, and parents of ECIA Chapter 1 students (formerly ESEA Title I) to meet Chapter 1's federal requirement to develop and maintain an IEP for participating students. Prior to the development of CADPP, IEPs were manually written, and required several hours of teacher planning and documentation. CADPP has now made available to educational programs an automated method for meeting the federal regulations of ECIA Chapter 1 and compensatory programs. The use of student prescriptions (IEPs), based on documented learner needs, has been automated to maximize instructional time and minimize the teacher's time-consuming, clerical activities.

The relational database requires the user to customize CADPP to the local educational program by loading files with the adopter's learning objectives or curriculum; learning characteristics of individual students served to include age, instructional level, and identified learning modality; and concept-related characteristics of available instructional materials to include readability level, interest level, and learning modality. When the files for skills, students, and instructional materials are loaded in the database, customized prescriptions (IEPs) can be generated for each student. CADPP also produces additional supplemental reports for school administrators and parents: a skill mastery report, by student, for any time period indicated; an instructional activities report by student, by skill, for any period indicated; and an instructional materials report, by skill, by teacher.

In addition to addressing Goals 3 and 4 of the National Goals for Education, CADPP program goals are to satisfy federal regulations governing the assessment, monitoring, and evaluation of compensatory education programs; provide educators with an

automated management system which minimizes record-keeping activities while maximizing the time available for instruction; ensure that the pre- and posttest NCE gains in reading and mathematics for participating students will be greater than national average NCE gains; maximize the use of existing available instructional materials and computer hardware, thus protecting the adopter's financial investments; and enhance the educational service provider's current method for delivery of services.

CADPP's claim is that participating students will exceed an annual NCE gain of zero. The trend for average gains in CADPP Reading programs has been greater than 5.0 NCEs, while the average gain in CADPP Mathematics programs has been greater than 7.0 NCEs. These results, when compared to the national NCE gains in compensatory education programs, are 90 percent greater in reading and 80 percent greater in mathematics. CADPP is approved by JDRP as a reading program for grades 3–9 and as a mathematics program for grades 3–7.

Requirements

CADPP operates on computers that read Apple BASIC and MS DOS (V 3.1 or greater). The Apple BASIC version requires two five-and-a-quarter inch disk drives; and the MS DOS requires a minimum 2 MB hard drive.

Costs

A demonstration copy of the MS DOS version is available for $15. A one-time fee of $149 is charged for the Apple BASIC version and $249 for the MS DOS version. In the commercial market, CADPP is comparable in design to Paradox, dBase IV+, and R Base System V, systems that can cost the user up to $5,000/school.

Services

- Awareness materials (printed literature, a "boiler-plate" grant application document, and a 45-minute videotape) are available at no cost.
- Program staff are available to attend out-of-state awareness meetings, conduct training at the adopter site, and to provide follow-up services to adopters.
- Training requires about 3 hours. No consulting fees are charged, and travel and per diem costs are negotiated with the user.

Contact

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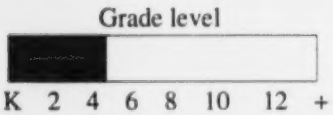
Technology in Education Corporation, Inc.
3936 West 78th Court, #21
Merrillville, IN 46410
219–769–1712

Developmental funding: USOE ESEA Title I
JDRP No. 79–15 (6/12/79) Recertified 3/5/92

Computers Helping Instruction and Learning Development (Project CHILD)

A computer-integrated instructional program for the elementary school.



Description

Project CHILD seeks to modify the school structure and create classroom conditions conducive for learning with technology, create cohesive units of work that foster strategies for thinking, and realign curriculum for reading, language arts, and mathematics. It provides a system for fully integrating technology into reading, math, and language arts, and classroom management techniques for using computers and hands-on learning. It also offers strategies for teaming, cooperative learning, and parent involvement.

Three classrooms form a Project CHILD cluster, grades K–2 or 3–5. Each of the three cluster teachers becomes a content specialist for one of the three Project CHILD subject areas in addition to being responsible for one grade-level classroom. Students from each grade in the cluster move among the classrooms to spend 1 hour a day working in each of the three subject areas. Thus teachers work in their specialty with the same students for 3 years. A Project CHILD classroom is organized with learning stations, and each has a computer station with 3-6 computers, a teacher station for small-group instruction, textbook and writing stations, and hands-on activity stations. Students follow a precise management plan for moving to the stations and set goals and record their activities in a book called a Passport. Required curriculum content is covered in 6-week thematic units.

Project CHILD addresses the National Goals for Education by serving as an effective dropout prevention strategy; increasing the academic performance of elementary students; providing a systematic approach to develop reasoning ability, problem solving, decision making, and knowledge application; focusing on systematic approaches to writing and communicating effectively; and emphasizing mathematics concept development in the early grades.

School-by-school and pooled effect sizes by grade derived from standardized test score data reveal positive effect sizes in reading and mathematics for CHILD students and significantly large effect sizes for students in lower-achieving schools and for those who participated for more than 1 year in the program. CHILD students have 2 percent fewer retentions overall, 6 percent fewer discipline referrals, and higher self-esteem and more positive attitudes toward school than non-CHILD students. Teachers express positive opinions toward the program. Project CHILD is approved by PEP for students in grades K–5.

Requirements

Two days of training are required for teachers and the principal before using the program, with 1 day of follow-up training at midsemester. A computer aide is required in the primary cluster classrooms to assist children in doing tasks such as selecting designated software and reading lesson menus. Obtaining full support from the superintendent and district staff, school board members, and parents is advised.

Costs

Start-up cost for a six-classroom K–5 unit with 180 students for CHILD materials, training, and on-site support is $11,500. Cost for renewal materials is $1,000.

Services

- Training and materials
- Follow-up site visits
- Consultations

Contact

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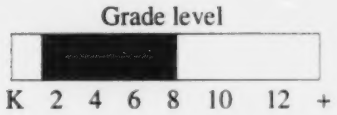
6700 Southpoint Parkway, Suite 100
Jacksonville, FL 32216
904–448–7612 or 800–226–7612

Sarah M. (Sally) Butzin
Daniel Memorial Institute, Inc.
PO Box 13296
Tallahassee, FL 32317-3296
904–385–6985 or 800–940–6985

Developmental funding: Florida State University, College of Education and Florida Department of Education
PEP No. 91–10 (4/92)

Conceptually Oriented Mathematics Program (COMP)

An outcome-based, objective-oriented, mastery learning mathematics program designed to meet the needs of all children.



Description

COMP is an objective-based, mastery learning mathematics program that provides sequential mastery skills with corresponding instructional materials to be mastered in the basic skills area of mathematics. It is designed to meet individual needs through small-group instruction. Inservice training includes effective classroom management techniques to improve teaching techniques. Students are tested to determine their individual strengths and weaknesses and are grouped accordingly. The program provides continuous progress through the use of materials organized into 25 instructional levels. Nine strands are developed for mastery in these 25 levels. Each level has been broken into two or more steps. Step Z in each level provides additional materials for the gifted and talented students. Critical thinking skills are developed throughout the 25 levels.

Requirements

The program uses cooperative planning and teaching. The ideal instructional situation is one in which each teacher has no more than two instructional groups. The program intends to encourage teachers to be creative in their teaching and to adapt the program to the learning styles of their students.

Key elements of the program are placement testing; teaching by objectives via COMP Guidebooks and COMP Activity books; small-group instruction; criterion-referenced testing; computerized drill and application activities (Levels 1–12, grades 1–5); cooperative teaching and planning; continuous progress for students; administrator involvement; school-community-parent relations. COMP is approved by JDRP for students of all abilities, grades 1–8.

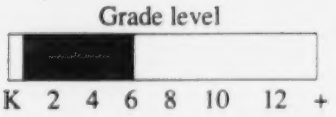
Contact

L. Leon Webb, Director
Pat Solem, Staff Development Specialist
Lois Petersen, Secretary
161 East First Street, Suite 5
Mesa, AZ 85201
602–969–4880

Developmental funding: USOE ESEA Title III
JDRP No. 74–114 (12/6/74)

Conservation for Children

A practical, economical program to increase conservation awareness, understanding, and action of elementary school children through a variety of basic skill activities designed for use in the classroom.



Description

Through a variety of basic skill activities intended for use in the classroom, this program teaches students about the interdependence of plants and animals, requirements of life, energy sources and use, pollution problems, recycling, and other conservation concepts based on scientific principles. The grade-level conservation guides provide instructional materials which combine basic skill practice in the areas of language arts, math, social studies and science with a conservation concept. Teachers can use the materials as a primary resource for teaching basic skills, as supplementary materials to a core program, as enrichment activities, skill review, or as independent units of study.

Evaluation data confirm that students using the materials for a minimum of 30 minutes/week master 80 percent of the learning objectives. In addition, 75 percent of the parents of 2,000 students in the evaluation study responded in writing that they had observed their children implementing conservation practices at home that they had never seen before the children used the program materials.

Materials include six grade-level curriculum guides and one all-levels guide (activities, resources). After the initial purchase of the guides ($25/grade level, $165 for the complete program), there are no ongoing costs for personnel, materials, or inservice training.

Conservation for Children is designed to relate directly to National Goal for Education 4 regarding conservation and energy education and indirectly to Goal 3 regarding basic skills. The program is approved by JDRP for children in grades 1–6.

47

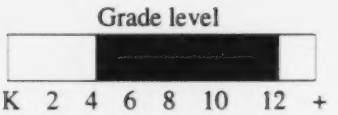
Contact

Marilyn Bodourian, Director or David Lidstron
Conservation for Children
1140 Boston Avenue
Longmont, CO 80501
303–651–2829 FAX 303–776–5934

Developmental funding: ESEA TITLE IV–C
JDRP No. 83–12 (3/4/83)

Content Reading Including Study Skills (CRISS)

A program to provide students in grades 10–12 with the content learning strategies and study skills they need to retain course information.



Description

CRISS was developed by teachers to provide instructional reading, writing, and learning strategies for the classroom. These strategies help students develop lifetime learning skills. Based in reading theory, the program's components range from analyzing textbooks and teaching text organization to helping students identify the main idea of a selection. Self-questioning, note-taking, organizing, and writing are emphasized as well as strategies for learning vocabulary independently. These components are integrated into the existing curricula. No additional equipment or materials are required for the program to be successfully implemented. Instruction is direct and includes four sequential components: introduction, modeling, guided practice, and independent application. This instructional sequence is followed in all aspects of the program.

Both college and noncollege bound senior high science and social studies participants in CRISS have demonstrated significantly greater gains (P.005) in the retention of science and social studies content information than comparable nontreatment students as assessed through free recall, recognition, and standardized content tests. CRISS is approved by JDRP for all students in grades 10–12. The program has been used in other settings in grades 4–9, but no evidence of effectiveness has been submitted to or approved by the panel.

Requirements

CRISS can be used by a district, school, or classroom teacher; no special facilities or materials are necessary. Teachers and administrators participate in a 2- or 3-day inservice. An on-site program director is named to work with CRISS staff to develop an implementation plan for the adopting district. The district agrees to provide information on the extent and quality of implementation.

Services

- Awareness materials are available at no cost.
- Program staff are available to attend awareness sessions (costs to be negotiated).
- Visitors are welcome at the program site.
- Training is available at the adoption site.
- Materials (including a 200-page training manual) are provided for each participant as part of the training.
- Adopter pays the training and materials fee.
- Implementation, follow-up, and evaluation services are available to adopters.

Costs

Costs for all services are negotiable.

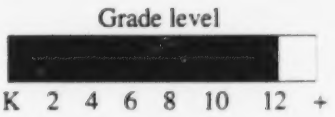
Contact

Lynn Havens or Carol Santa
CRISS
School District #5
233 First Avenue East
Kalispell, MT 59901
406–756–5015, Ext. 44

Developmental funding: Title IV–C
JDRP No. 84–7R (2/26/85)

Coordinated Learning Integration—Middlesex Basics (CLIMB)

A skills-based program of reading, writing, and mathematics instruction for students of all ability levels, including Chapter 1, special education, and migrant education.



Description

The program's goal is to improve the performance of all students in reading, writing, and mathematics through the following:

- A coordinated program of instruction produced by teachers which includes
  - — *Skills arrays*. Identifies reading and mathematics skills K–12.
  - — *Writing package*. Integrates reading-writing-thinking skills across the curriculum.
  - — *Survey and criterion referenced tests*. Diagnoses and evaluates student performance.
  - — *Simplified record-keeping system*. Monitors continuous student progress K–12.
- Training which prepares staff to use the program includes
  - — Use of the curriculum package.
  - — Correlation of adopting district's curriculum materials, testing, and objectives to CLIMB skills arrays.
  - — Teaching strategies and techniques—mathematics training that incorporates the NCTM standards and provides a "hands-on" fun approach to mathematics. Reading-writing training integrates the CLIMB framework into a whole language, literature-based, or basal approach.
  - — Procedures for classroom use.
  - — Content reading and study skills strategies for all disciplines.
  - — Follow-up training designed to meet the needs of adopting districts.
- A management design that coordinates and integrates personnel, materials, and services, and
  - — Provides a design for communication between classroom instruction and support services.
  - — Provides a system for coordination of instruction across grade levels.

— Fosters a unified approach to achieve instructional goals.
— Delineates roles for program coordination.

The program helps to fulfill Goal 3 of the National Goals for Education. Student achievement and citizenship will be met integrating skills into curriculum, creating students who can apply skills learned, and fostering lifelong learning.

In a 4-year study of effectiveness, there was a 50 percent reduction in the remedial basic skills population and statistically significant and sustained growth in 10 of the 12 grades in reading (.01) and 11 of the 12 grades in mathematics. CLIMB is approved by JDRP for students of all ability levels K–12, including Chapter 1, special education, migrant education, ungraded primary, and ESL.

Requirements

The program can be used in reading-writing, mathematics, or both at any or all grade levels. It can be adopted for the regular classroom, Chapter 1, special education, migrant education, ungraded primary, and gifted programs. Teachers and administrators participate in a 2-day training for effective use of the CLIMB curriculum and management design. A follow-up training session is recommended. Teachers must be supplied with curriculum materials.

Costs

Start-up costs are about $60–$160/classroom teacher for curriculum materials and supplies. Maintenance costs are minimal. Training costs are negotiable.

Services

- Awareness materials are available at no cost.
- Visitors are welcome at the program site by appointment.
- Program staff are available to attend out-of-state awareness meetings.
- Training is conducted at the program site or adopter site.
- Implementation and follow-up services are available to adopters. All costs are negotiable.

Contact

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Project CLIMB
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Administration Offices
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Middlesex, NJ 08846
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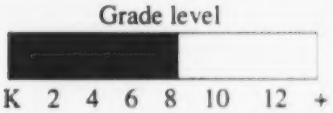
Developmental funding: NJ TEEA R&D and USOE ESEA Title IV–C
JDRP No. 81–44 (1/28/82) Recertified 9/85

Cupertino Concept: Computer Literacy and Beyond Program

A staff development program for the integration of technology into the curriculum.



Description

Through an integrated use of technology in the curriculum, this program aims to develop fully functional students empowered to deal with an information-based society through development of skills for assessing, creating, and manipulating information products and services. To realize this goal, a process has been developed whereby teachers help students use technology as a tool to enhance learning in the curriculum content areas.

There are six strands in the Cupertino Concept model: philosophy, software, hardware, lead teacher network, staff development, and curriculum. The ultimate goal of each strand is the development of a local plan to assist the adopter.

Replication elements for this program include management and staff training, technology planning, technical support, curriculum development, and evaluation. Adopters can be trained to use a similar program in a 1-day workshop. A more comprehensive 2-day workshop is also offered. The program is approved by JDRP for students in grades K–8 and as a staff development program.

Costs

Costs consist of honorarium, travel, and per diem to be paid by adopter-facilitator. Training is tailored to client needs. Additional materials include a training manual and computer literacy guide (Training manual (including computer literacy guide) is $75. Computer literacy guide alone is $10.00).

Services

- Awareness materials are available at no cost.
- Visitors are welcome on site by appointment.
- Program staff are available for awareness meetings (cost to be negotiated).

Contact

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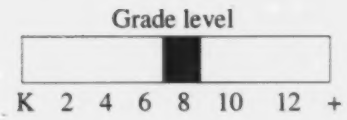
408–252–3000 Ext. 340 or 353–4584

Developmental funding: ESEA Title IV–C
JDRP No. 83–37R (3/30/84)

Decision-Making Math (DMM)

A program for improving students' capabilities in identifying, analyzing, and solving problems.



Description

DMM is a supplementary problem-solving program that teaches problem-solving and decision-making skills to develop students' mathematical power. It was developed by the Education and Technology Foundation to meet not only the needs of students so that they will be powerful problem solvers and effective decision makers, but also the needs of teachers who wish to create a problem-solving climate in the classroom. The program directly focuses on the Curriculum and Evaluation Standards of the National Council of Teachers of Mathematics and the National Goals for Education. It addresses the need to create interactive classroom environments that encourage and develop more sophisticated mathematics skills of reasoning and communication. DMM brings to schools a proven and exemplary instructional program for both teachers and students that will provide teacher training that improves problem-solving knowledge and provides instructional techniques that infuse problem solving within mathematics; curriculum in which students confidently learn and apply problem-solving skills and strategies on their own, in groups, and at home; program assessment to evaluate impact on student achievement and classroom use; and integrated follow-up activities and technical assistance that ensure local and national institutionalization and help create systemic change.

The primary goal is to provide an integrated mathematics problem-solving program that allows students to go well beyond gains produced by existing programs. The emphasis of the program and the training is on process rather than solution. Cooperative learning and alternative assessment techniques are stressed throughout. Many methods are used to ensure understanding such as questioning and planning, interpreting and verifying, organizing and manipulating data, and analyzing and applying solutions.

The second major goal is to improve teaching skills and techniques to create classroom climates where students and teachers alike are

required to communicate and reason with one another in a sophisticated manner. These higher levels of reasoning and thinking are developed through materials, investigations, teaching methodologies, and alternative assessment techniques.

DMM has demonstrated consistent and significant gains in student achievement as measured by Mathematics Concepts and Applications in the Comprehensive Test of Basic Skills. It is approved by PEP for students in grade 7–8 mathematics classes and grade 9 general or basic mathematics classes.

Requirements

Teachers use DMM about one-fifth of their class time to complement their regular mathematics program. They attend a full day of inservice, acquire one complete curriculum set per teacher, and duplicate student materials. An additional 1-day follow-up workshop is highly recommended to ensure successful implementation. Classroom adoption can be assessed using the DMM Criterion Reference Test. DMM may be adopted by a district, school, or individual teacher.

Costs

Initial adoption costs include the one-time purchase of the curriculum materials that consist of the *DMM Binder*, 16 *Student Guide to Problem Solving Workbooks*, and 128 *Strategy Practice Cards* for $99. Training costs are negotiated to include consultant fee and travel expenses.

Services

- Awareness materials are available at no cost.
- Program services include a 1-day training workshop, an optional follow-up workshop, quarterly mailings, assistance with program use and evaluation, and ongoing technical assistance.
- Interested educators are welcome to visit demonstration sites across the country.

Program staff are available for awareness meetings and training which can be conducted at the adopting site.

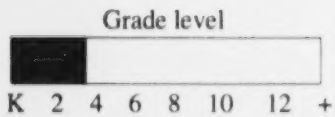
Contact

Laura Dunn and Kristine A. Shaff, Co-Directors
Education and Technology Foundation
4655 25th Street
San Francisco, CA 94114
415–824–5911

Developmental funding: Information not available
JDRP No. 87–10 (6/1/87)

Developmental Approaches in Science and Health (DASH)

A comprehensive program designed to develop scientific literacy by facilitating the learning and application of basic concepts and skills in science, health, and technology in authentic, practical ways.



Description

DASH addresses all six dimensions of scientific literacy advocated by *Project 2061, Science for All Americans;* restructures the curriculum by integrating science, health, and technology; is designed to meet the emerging standards for science education being developed by the National Research Council; provides effective, field-tested activities in an easy-to-use program; and is designed for national dissemination and use in diverse school settings. Students with wide-ranging backgrounds, abilities, and learning styles learn concepts and skills in contexts of authentic technological and scientific exploration, invention, and explanation, which provide models for thinking and problem solving. Individual and group activities focus on making sense of new information, making connections with what is already known, and then using new knowledge to expand understanding of the world.

Materials are designed for use by classroom teachers or departmentalized science teachers and consist of grade-level teaching guides containing activities and support materials for teachers and students organized into 10 clusters: Learning; Time, Weather, and Sky; Plants; Animals; Food and Nutrition; Health and Safety; Energy and Communication; Wayfinding and Transportation; Matter, Space, and Construction; and Conservation, Recycling, and Decomposition. Activities are designed to articulate with other subjects, including language arts, mathematics, music, art, social studies, and physical education.

Multiple sources of evidence (e.g., observations, artifacts, documents, and interviews) from seven case-study data bases

demonstrate that DASH students understand fundamental concepts, the use of basic inquiry skills and data gathering techniques, and the integration and application of concepts in science, health, and technology and are self-directed learners taking responsibility for their own learning as reflected in engaged learning time, planning and completion of tasks, and use of multiple resources. DASH teachers change their attitudes and approaches toward elementary science in ways that result in increased instructional time spent on science and focus on students' learning. The program is approved by PEP for students in grades K–3.

Requirements

Teachers participate in 10 days of initial training and monthly staff development meetings during the first 2 years of use and purchase DASH and local materials.

Costs

Start-up cost for training and materials is $500–$550/classroom; second year cost is $200/classroom for materials and monthly staff development meetings; and subsequent yearly cost is $100/classroom for materials.

Services

- Training and curriculum materials
- Follow-up consultation

Contact

Donald B. Young
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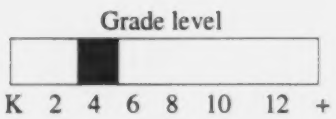
University of Hawaii
1776 University Avenue
Honolulu, HI 96822
808–956–6918 FAX 808–956–4114

Developmental funding: University of Hawaii; Hawaii State Department of Business, Economic Development, and Tourism; National Science Foundation, and Buhl Science Foundation
PEP No. 93–13 (3/26/93)

Diagnostic Prescriptive Arithmetic (DPA)

A basic arithmetic program with emphasis on developing, modeling, and mastering the basic concepts and skills.



Description

DPA is a process-oriented program emphasizing the development and refinement of teacher modeling and questioning skills. It includes counting, place value, addition, subtraction, multiplication, and division of whole numbers. Problem-solving skills are developed and reinforced through ongoing experiences with estimation and approximation, data collection, organization and interpretation, and real-life applications of arithmetic skills.

Diagnostic tests for the major arithmetic topics (three levels) are used throughout the year to determine students' strengths and weaknesses both in concepts and skills. Prescriptions are then planned using the *DPA Teacher's Manual*, manual supplement, and other DPA resource materials. Each of the concept-developing and reinforcement activities in the manual has specific objectives related to the arithmetic instructional sequence and the diagnostic test items. The manual also includes descriptions of ongoing mathematics experiences, record-keeping procedures, classroom management techniques, and instructions for developing a variety of teacher-made materials.

The program can be used in self-contained elementary grade classes as the arithmetic component of the mathematics program or as a co-curricula remediation program (PSEN; Chapter 1). Both approaches are essentially the same. A topic section of the DPA diagnostic test is administered, and the results are analyzed for group and individual needs. These data are recorded on an analysis chart that aids the teacher in forming instructional groups and planning a program. Students begin at their level of understanding, and they may work with or without the teacher in a large group, small group, or independently.

Students may use concrete materials for modeling a basic concept and may work with a DPA activity for reinforcing a new skill. They may complete a written activity for practice or may help in the school by applying arithmetic to a real-life situation. DPA is approved by JDRP for students functioning at grade levels 3–5.

Contact

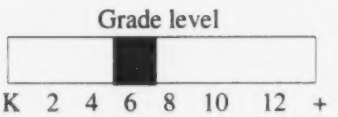
Bonnie Hawthorne
Kessler School District #2
2420 Choteau
Helena, MT 59601
406–442–0150

Sally Logan
417 North Main
Louisiana, MO 63353
314–754–5953

Developmental funding: USOE ESEA Title I
JDRP No. 74–68 (9/18/74) Recertified 11/84

Effective Videodisc Instruction in Core Mathematics Concepts

A videodisc instructional program approved for students of all ability levels including remedial, mainstreamed, and mildly disabled students.



Description

The program enhances the ability of teachers to provide instruction in mathematics through the classroom use of videodiscs. The technology is used to emphasize prerequisite skills, providing systematic review and guided practice in small steps.

The teacher, using a handheld remote control, conducts the videodisc lesson while monitoring and supporting students. Videodisc demonstrations are briskly paced, with intensive questioning. Each lesson has five to seven major checkpoints; if students are experiencing difficulty, the teacher can provide additional guided practice through the videodisc. To ensure an emphasis on concept development rather than rote learning, two or three sets of parallel examples are available for reteaching. The combination of quickly paced video demonstrations, intensive questioning, and increased presence of the teacher on the classroom floor all enhance academic learning time.

Each lesson consists of videodiscs, student workbooks, and a teacher's manual. Workbooks are primarily used for independent practice. During the interactive videodisc activities, most of the written student responses are made in notebooks. Student interaction is intensive, and demonstrations are rarely more than 30 seconds before a written response is required.

This program has consistently and substantively improved student achievement when compared with preexisting instructional programs. It has shown considerable strength in addressing the needs of low achievers and mildly handicapped students, and has supported regular classroom teachers' efforts to teach special education in the regular classroom. The program is approved by PEP for students of all ability levels in grades 5–7, including remedial, mainstreamed, and mildly handicapped students.

Requirements

Color television and videodisc hardware are required. No additional personnel are necessary. Training is provided in the cost of purchasing the materials.

Costs

Most grade 5 use would use the fractions and decimals program, with a total of four videodiscs containing intense instructional support for more than 50 hours of instruction. Higher grades would add the 40-hour, three-disc word problems program. The typical would be $2,600/building (three to four teachers in grade 5) and include the videodiscs, teacher's manual, 35 fractions workbooks, 35 decimals workbooks, and permission to copy workbooks. Videodisc players are $400–$650, and a color television monitor is needed. As a volume discount, a free videodisc player will be provided with every seven discs ordered.

Services

- Staff development (included in the cost of materials) involves an initial 2-hour training session and an individual follow-up visit with the teacher during the second week. Included in each videodisc program is a placement test to check on skills development that can be used for management and monitoring.

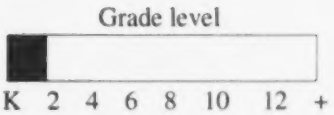
Contact

Alan Hofmeister
Technology Division
Developmental Center For Handicapped Persons
Utah State University
Logan, UT 84322–6800
801–750–3718

Developmental funding: Federal Office of Special Education Programs
PEP No. 89–11 (5/17/89)

First Level Mathematics (Kindermath)

A comprehensive program in mathematics fundamentals using concrete objects and actual physical operations for initial mathematics instruction.



Description

Diagnostic-prescriptive in nature, this program provides a sequential curriculum for individual developmental growth. The 90-lesson curriculum consists of the following nine components: same and different; patterns; sets 0–5; shapes; sets 6–10; numerals 6–10; signs; and addition-subtraction. Key elements of the program are developmental hierarchies, mixed instructional modes, and extended curriculum range. The program addresses Goal 4 of the National Goals for Education by providing special mathematics emphasis in the earliest grades and increasing the number of teachers with a substantive background in mathematics.

The program has been designed to be used by both regular and special education teachers. Because it is available in Spanish, it is also appropriate for use in bilingual and ESL programs. The entire program is also available for the computer. The 13-disk system is tutorial in nature, uses a voice synthesizer, and may be used without the assistance of the teacher.

As a result of participation in the program, children in their first year of mathematics instruction demonstrated statistically significant growth in knowledge of mathematics relative to national norms on three standardized tests of mathematics achievement. It is approved by JDRP and PEP for children in their first year of mathematics instruction, kindergarten, or first grade.

Requirements

The program may be used in an individual classroom, a single school, or a district. Teachers wishing to use the program and management system should attend a training workshop that is most often held at district or regional sites. Administrators and paraprofessionals are also encouraged to attend training sessions. A training tape, complete with training manual, is available for use by those who prefer this type of workshop. One Kindermath kit is required per classroom. Software for the program (if desired) exactly matches the lessons in the original kit. Materials are nonconsumable.

Costs

Training costs consist of travel expenses for the trainer plus $70/classroom for the one-time-only purchase of the classroom kit.

Services

- Awareness materials are available at no cost.
- Visitors are welcome by appointment at the program site and additional demonstration sites.
- Program staff are available to attend out-of-state awareness meetings.
- Training is available at the program site or adopter site.
- Implementation and follow-up services are available to adopters.

Contact

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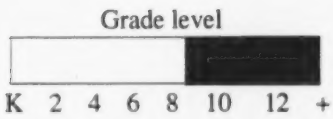
215–687–6252

Developmental funding: PRIMAK Educational Foundation
JDRP No. 84–1 (1/24/84) Recertified 2/13/90

Fish Banks, Ltd.

A computer-assisted simulation to improve academic achievement and increase communication skills.



Description

Fish Banks, Ltd. creates profound insights into how depletion of natural resources can result from the interaction of ecological, economic, corporate, and psychological forces. It conveys factual knowledge about a major environmental issue and motivates students to be informed and effective citizens.

The program simulation is a group process involving analytic reasoning, negotiation, and collective decision making. As an interdisciplinary model it provides linkages to environmental science, biology, economics, social studies, and mathematics. One teacher can run the program with 5–50 students. The simulation takes about 2 hours to run and 1 hour to debrief, which can be divided over several class periods.

Fish Banks, Ltd. helps students achieve National Goals for Education 3 and 4. High school and college students who participated in the program show significantly greater gains on a program-developed test of knowledge and academic skills than comparison groups. Teachers have positive attitudes toward the simulation and certify the high level of student involvement and excitement. The program is approved by PEP for grades 9–12 and college students.

Requirements

Teachers or schools must purchase a kit consisting of a game administrator's manual; a materials manual, including masters for more than 50 overhead transparencies used in introducing and debriefing the exercise, and masters for all student handouts; a game board; wooden ships; fish money; and an IBM compatible or MAC program disk. A 6-hour teacher training session is available. Access to a microcomputer, printer, and overhead projector are also necessary.

Costs

Start-up costs include $100 for the simulation kit and $15 to produce the overhead transparencies. Handout cost for each session is minimal. Training costs, primarily travel, lodging, and meal

expenses, are negotiated between the program staff, state facilitator, and the local adopter.

Services

- An awareness brochure can be requested at no cost.
- An awareness video is available through many state facilitators or it can be borrowed or purchased ($5) from the program.
- A sample role description is also sent upon request.
- Kits are available for preview.
- A table-top exhibit can be mailed for use at meetings or conferences.
- Program staff or certified trainers offer awareness, training, and follow-up support (costs to be negotiated).

Contact

Karen Burnett-Kurie or Dennis Meadows
Institute for Policy and Social Science Research
Hood House
University of New Hampshire
Durham, NH 03824–3577
603–862–2186

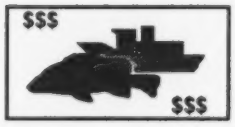
Developmental funding: Local
PEP No. 91–12 (3/19/91)

FISH BANKS, LTD.

ROLE DESCRIPTION

AND OPENING SCENARIO

Congratulations! You have just been hired to manage one of the principal fishing companies in your country. Together with the others in your company - captain and crew members - you will operate your fishing fleet each year according to policies you design to maximize your assets. The rules and information required for your success are provided below.



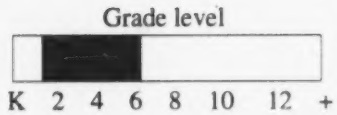
DECISIONS

Each round you must determine your fleet size by deciding whether to bid for ships at auction, make ship trades with other teams, order new ships to be constructed by the shipyard, or maintain your fleet at its current size. Then you must decide how to divide your ships among the Coastal and Deep Sea fishing areas and the Harbor. You will be most successful if your decisions are based on a long-term strategy for fleet size and allocation. You must also take into account the actions of the other teams and modify your strategy accordingly.

Sample page from Fish Banks, Ltd. role play.

FOR SEA: Investigating Marine Science

Interdisciplinary, activity-oriented, marine education.



Description

By the year 2000, three out of four Americans will live within an hour's drive of the sea or Great Lakes coasts. The impact on these coastal waters will be severe. FOR SEA curriculum materials are designed to equip students with the experiences and information necessary to make responsible decisions about the marine environment.

Focusing on the development of basic science skills and knowledge, FOR SEA provides interdisciplinary, activity-oriented, marine education curriculum and teacher training. The magic draw of water provides incentive to teach and learn science. FOR SEA has been used successfully as a core curriculum and has likewise proven effective in a thematic-unit teaching strategy. Close proximity to seawater is not necessary to use this curriculum in the classroom. Curriculum guides are available for grades 1–2, 3–4, and 5–6. Each guide contains teacher background for each activity, student activity and text pages, answer keys for student materials, and vocabulary list. The program is approved by PEP for all students, grades 1–6.

Requirements

FOR SEA is designed to be used in classrooms at a room, grade, school or districtwide level. Inservice training provides teachers with an overview of the program, implementation procedures and hands-on activity sessions to familiarize participants with activities appropriate for their specific grade levels. Participants' feedback has confirmed the value of 2-day workshops, with a minimum requirement of 6 contact hours. Training can be provided for groups of 10–32 educators. Training agendas can be tailored to serve specific grade levels or include all teachers, grades 1–12. (Please see listing for Marine Science Project: FOR SEA, grades 7–12.) A copy of the appropriate grade-level curriculum guide must be purchased for each implementing teacher at $35/guide. Student text materials in the guide are designed to be reproduced by adopting

sites. Hands-on materials required in most activities are generally found in the school setting or are readily available at local grocery, variety, or pet stores. Start-up costs vary by site.

Services

- Awareness brochures and samplers of curriculum are available.
- Program staff or certified trainers can deliver awareness sessions, with negotiable cost-sharing.
- Inservice training is provided at the adopting site.
- Negotiable costs include trainer's honorarium, travel, and per diem.
- Follow-up services are provided by the program, based on site needs.

Contact

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Assistant Superintendent, Curriculum and Instruction
Olympic Educational Service District 114
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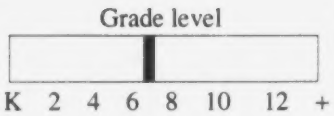
206–479–0993

Developmental funding: USOE ESEA Title IV–C
JDRP No. 81–37 (1981) Recertified 3/88

Foundational Approaches in Science Teaching: FAST

A course in the concepts and methods of the physical, biological, and earth sciences and their relation to the environment.



Description

FAST is a full-year course giving students a sense of the operations of the modern scientific community by involving them in typical science activities. Laboratory and field oriented, FAST is designed for use with students who represent the full range of abilities and interests found in the typical middle or junior high school classroom. Instructional strategies are structurally sequenced to address differences in learning styles and to develop thinking skills.

Students study three strands concurrently: physical science, ecology, and relational study. The physical science strand introduces such concepts as mass, volume, density, buoyancy, physical and chemical properties of matter, pressure, vacuum, heat, temperature, and energy; the ecology strand such concepts as ecology, plant and animal growth and development, weather and climate, field mapping, and population sampling; the relational study strand such concepts as resource management, technology, environmental use, energy use, and conservation.

Student and teacher materials guide student investigations. The Student Record Book enables students to record a concise log of individual and class activities. A classroom library of reference booklets, which describe use of instruments, suggest experimental designs, outline experimental techniques, and provide necessary supplemental readings, helps students to practice the skill of using outside references to supplement information available from the investigations and Student Book. The *Teacher's Guide* presents the logic connecting topics and sequences. Keyed to the investigations in the Student Book, the *Teacher's Guide* includes teaching suggestions, advice on classroom procedures, and detailed discussion of the conceptual and practical development of the students' investigations. Other materials for teachers include the *Instructional Guide* and *Evaluation Guide*.

FAST also includes HI–NEST, an international computer network linking FAST students and teachers. The primary objective of HI–NEST is to establish a national and international network in which students can collect, analyze, and share environmental data. HI–NEST currently links FAST schools in California, Hawaii, Maine, Minnesota, New Jersey, North Carolina, South Carolina, Ohio, Texas, Virginia, Connecticut, New York, Vermont, Washington, Illinois, Missouri, Moscow, Singapore, Budapest, Jakarta, and Japan. FAST is approved by JDRP for students in grade 7.

Contact

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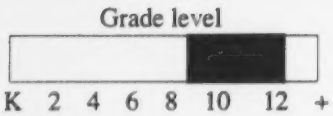
Honolulu, HI 96822
808–956–7863 FAX 808–956–4114

Developmental funding: University of Hawaii
JDRP No. 80–2 (12/9/80) Recertified 1/85

70

Geology Is

An introductory geoscience course to promote wise use of the Earth's resources.



Description

Designed to become part of the secondary school curriculum, Geology Is provides geoscience learning opportunities not presently available in the science curriculum. A broad range of materials and media-delivery instruments allow for varied teaching and learning techniques.

The technical aspects of course content and the social implications in the wise use of the Earth's resources combine in an effective interdisciplinary approach. Awareness and understanding of geoscience processes make students more responsible consumers of earth materials and protectors of the environment.

The five distinct but related units are Introduction, Earth Materials, Observing the Earth, Internal Processes, and External Processes. These are subdivided into a total of 20 chapters. Although it is a two-semester course, parts can be taught as a semester offering. Each unit contains text material, lab exercises and activities, and objective and subjective tests.

Slide-tapes, films, videotapes, and guest speaker presentations are offered, and students are encouraged to evaluate these. Small groups and individuals investigate topical areas for student-led class discussions.

Off- and on-campus field experiences and resource personnel add another dimension to the text. Teachers are provided with a guide and an activities handbook as a supplement to the student textbook. Through study in this elective option, students can become more responsible consumers of the Earth's resources and make informed decisions for the future regarding energy, geologic hazards, and land use.

The program is approved by JDRP for all students, grades 9–12.

Contact

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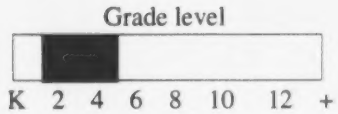
O'Fallon, IL 62269
618–632–3507

Developmental funding: USOE ESEA Title IV–C
JDRP No. 81–42 (12/18/81) Recertified 2/86

72

Hands-On Elementary Science

An instructional program intended to provide elementary students with hands-on experiences emphasizing the processes of science as an approach to problem solving.



Description

Instruction that emphasizes the development of science processes as an approach to problem solving is the basis of this program. In fostering positive attitudes toward teaching science, it increases both the amount of science taught and the proportion of instruction dedicated to the processes of science. The curriculum employs a set of higher order processes at each grade level consisting of four basic units. The units consist of lessons concerning a unifying topic. The topic is based upon the skills identified for that grade level. First grade students work primarily on observation in the four units of seeds, patterns, magnets, and liquids. Second grade emphasizes classification skills through the study of insects, sink or float, measurement, and life cycles. In grade 3, experimentation skills are developed by units on flight, measuring, plants and structures. Fourth grade focuses on analysis in units on bio-communities, electricity, chemistry, and energy transfer. The grade 5 curriculum emphasizes application and consists of units on earth science, soil analysis, animals, and ecosystems.

Since this is not a text program, all lessons are based upon hands-on activities supported and defined by curriculum guides at each grade level. They provide a sequence of basic lessons and incorporate all necessary materials to support the program lessons. A feature of the program is an optional package of materials students may request to work on over the summer. The program is approved by JDRP for elementary teachers and students, grades 1–5.

Requirements

The program is transportable to other sites where a commitment exists for hands-on science instruction. Adoption requires at least a half year for planning and preparation followed by a staff development program. Teacher preparation consists of 2 days training prior to the implementation of the program followed by follow-up workshops to resolve problems of implementation.

Materials required include both a curriculum guide and a kit of materials of the appropriate grade level for each teacher.

Costs

The cost of the program in the installation year is about $17.50/student (assuming 25 students/class in a school of 800 students and training 20 teachers). Subsequent years' costs to maintain the program through the replacement of consumable supplies equals $1.50/student. Teacher guides are available for $15 each plus postage and handling, and kits are available from a national vendor at costs ranging from $465–$615 depending upon the grade level.

Services

- Awareness materials are available at no cost.
- Visitors are welcome by appointment at the program site and additional sites in their home state.
- Program staff are available to attend out-of-state awareness meetings (costs to be negotiated).
- Training is available at the program site and also at the adopter site (costs to be negotiated).
- Implementation and follow-up services are available (costs to be negotiated).

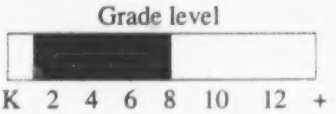
Contact

Helen Herlocker
Dissemination Center For Hands-On Elementary Science
Carroll County Public Schools
PO Box 661
Hampstead, MD 21074
410–374–1358 FAX 410–239–4373

Developmental funding: Federal, state, and local
JDRP No. 86–19 (9/23/86)

Help One Student To Succeed (HOSTS) Math

A diagnostic-prescriptive-individualized approach for at-risk students.



Description

HOSTS Math is a self-contained program that includes a diagnostic-prescriptive component that accurately places students in a precise sequence of mathematics skills. Each youngster moves from one skill to the next as mastery is demonstrated.

Teachers are provided with lesson plans and activities for each skill that are designed to build a conceptual understanding before proceeding to the symbolic level of drill and practice. Material is offered in manageable segments with attainable goals for students. This allows students to feel successful in mathematics achievement. HOSTS Math is compatible with all major mathematics basal series.

Complete lesson plans, activities manuals, student worksheets, tests, and answer sheets are provided for paper-and-pencil work covering 18 strands. Fifteen computer disks, designed for the Apple II series computer, are included for drill and practice as well as testing, along with a record-keeping component for class management.

The program encourages the use of manipulatives for each objective to provide the instructor with several options to encourage mental math, problem solving, and development of higher order thinking skills.

HOSTS Math has been designed to offer several options to accommodate various learning styles and provide a fun-to-learn atmosphere for instructors and students. The program is approved by JDRP for remedial mathematics instruction for elementary and junior high students.

Contact

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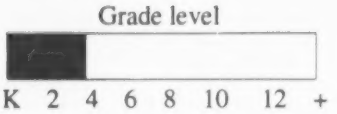
Vancouver, WA 98662-6459
206–260-1995

Developmental funding: USOE ESEA Title IV–C and private
JDRP No. 82–8 (4/9/82)

High/Scope K–3 Curriculum

A method for organizing and managing classrooms and instructional activities to help at-risk students improve their school achievement and literacy skills by giving them opportunities to engage in learning activities that contribute to their cognitive, social, and physical development.



Description

The High/Scope K–3 Curriculum views children as active learners who learn best when they themselves plan, carry out, and reflect upon activities. Teaching staff observe, support, and extend children's activities by maintaining a daily routine that permits children to learn actively and construct their own knowledge; arranging instructional activity centers in the classroom to provide learning experiences in math, language, science, art, social studies, movement, and music that match children's needs and address appropriate content, skills, and concepts in these areas; joining in the children's activities, asking questions that extend children's plans, and helping them think; organizing daily small-group instructional workshops involving concepts and skills in all of the content areas; and engaging children in key child development experiences that help them learn to make choices and solve problems. Other features of the program include a child observation assessment technique, an emphasis on parent involvement, and a nationwide training network.

At-risk students in classrooms using the High/Scope K–3 Curriculum score significantly higher on overall achievement and subtests in reading, language, math, science, and social studies on standardized achievement tests than comparison students in classrooms with a traditional K–3 curriculum. The program is approved by PEP for students in grades K–3 and their families.

Requirements

No special equipment or materials are required beyond the computers and developmentally appropriate manipulative and print materials that should be present in all good K–3 classrooms. However, classrooms need to be rearranged into activity areas. Training is open to administrators and teaching and caregiving staff working with children 5–9 years old in public and private

elementary schools, day care centers, and homes. Several training options are available for teacher training through High/Scope.

Costs

The cost for the 2-day workshop activities is $125/person for groups of 40 or more. Handout materials are included. Services on a consulting or contractual basis are available according to local needs. Consulting fees and travel expenses are negotiated on an individual basis. Week-long institutes can also be scheduled for groups of 20 or more. Institute fees are $400/person plus travel costs for High/Scope staff. Customized implementation plans include training for up to 3 years with costs ranging from $28,500–$65,000 depending upon location, group size, and duration of the training activities. Videotapes (five total) are recommended for each program at a cost of $450. Printed teacher curriculum guides and supporting materials are required, at a cost of $230.

Services

- Training and materials
- Follow-up consultation

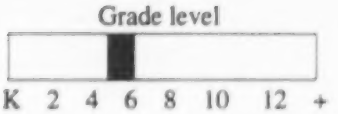
Contact

A. Clay Shouse
Director, Development and Services
High/Scope Educational Research Foundation
600 North River Street
Ypsilanti, MI 48198
313–485–2000 FAX 313–485–0704

Developmental funding: U.S. Department of Education, Follow Through Program, state, and other
PEP No. 92–8 (3/92)

Individualized Prescriptive Arithmetic Skills System (IPASS)

A criterion-referenced testing and instructional program in basic mathematical skills using microcomputers.



Description

IPASS was designed to increase the achievement of intermediate grade students in mathematics through the use of advanced technology in the form of microcomputers. The program employs microcomputers and specially designed software as an integral part of both instruction and the management of student progress in a compensatory education setting. It is an efficient and highly cost-effective program. The program is approved by JDRP as a supplementary mathematics program for grades 5–6. It was developed as and continues to be an ongoing Chapter 1 program.

IPASS includes locally developed criterion-referenced tests, instructional and management software, cross-referenced tests, cross-referenced instructional resource file, and guides for teachers and students. It's objectives can be used to supplement most mathematics curricula without modification.

Requirements

The program is designed as a "pull-out" in which the student receives two 30-minute sessions a week. It can be adapted to a classroom or laboratory setting. A teacher or aide using two microcomputers can serve up to 40 students/week. Locally developed instructional materials can be integrated into the remediation process. The program has been adopted in more than 120 school districts in 20 states. Evaluation data are available upon request.

Services

- IPASS is available for R/S TRS–80 models III and IV, R/S Color disk (32K) Apple IIe, and IBM-compatibles.
- The cassette version is no longer available.

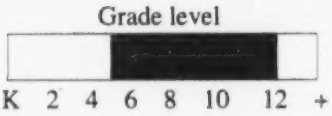
Contact

Robert R. Reynolds, Director
IPASS
Pawtucket School Department
Park Place
Pawtucket, RI 02860
401–728–2120

Developmental funding: USOE ESEA Title I
JDRP No. 82–23 (5/27/82) Recertified 6/5/86

Informal Science Study (IFSS)

A series of physical science mini-units for all students based upon students' recall and use of popular amusement park rides, sports, and playground experiences.



Description

To promote concept acquisition, IFSS presents a series of physical and biological science mini-units which are based upon students' recall and utilization of popular amusement park rides, sports, and playground experiences. Learning activities are selected for their appeal and ability to provide concrete examples of otherwise abstract concepts. Topics include motion, speed, velocity, acceleration, relativity, forces, gravity, time, conservation of energy, frames of reference, fears, and phobias. Science processes include inferring, graphing, predicting, and forming hypotheses. Each of the mini-units is designed around student dialogs, providing an introduction and review (application) of both science and mathematics in low-key and nontechnical language. Science terms are introduced only after students recall previous experiences. In addition, several of the mini-units provide laboratory activities that employ toys (race cars, model rockets, etc.) and playground equipment. Mini-units include the following:

Physics of Fun and Play is designed for any of grades 5–12. The focus is on the physics of amusement parks and sports. Slides and videotapes present the motion physics of amusement parks and playgrounds. Students are encouraged to apply motion physics ideas to each of the settings.

Science Safari and Toy Workshop is designed for grades 5–9 and presents physics mechanics content and terms as well as pre-algebra mathematics exercises that allow students to deal with the quantitative elements of motion laws. A special part of this mini-unit focuses on common toys and their action in the orbiting space shuttle, Toys in Space.

Spaceflight Forces and Fears is a two-part module that deals with the application of mechanics concepts on amusement park rides as they relate to the experiences of orbiting astronauts. Students

(preferably in grades 7–10) also explore physiologic reactions to amusement park rides by comparing their simulated reactions to those of students who have ridden the rides.

Mechanics of Motion is designed for high school physics classes. Students are required to use algebra and pre-calculus mathematics to focus on the design and operation of amusement park rides. Additional computer simulations are available for classes that have access to Apple II computers.

The Discovery Field Experience focuses student attention on amusement park rides and sport activities. Slides, videotapes, and actual field experiences are emphasized for learners in grades 5–12.

With instructional periods from 1–3 weeks, students significantly increase knowledge and comprehension of science concepts, increase their analytic recall of science experiences, and demonstrate significantly increased applications of science concepts. IFSS is approved by JDRP for all students in grades 5–12.

Requirements

Mini-units may be adopted individually or as a group. Teachers can be trained in 4 hours.

Services

- Awareness materials are available at no cost.
- Visitors are welcome to visit the program site by appointment.
- Project staff is available for awareness and training.
- Costs for these sessions are negotiable.

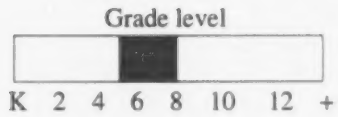
Contact

Howard Jones, Director
or Stephanie Hendee
National Training Network
500 Coffman, Suite 204
Longmont, CO 80501
800–659–5004 or 303–651–0833 FAX 303–651–1044

Developmental funding: National Science Foundation
JDRP No. 84–11 (3/30/84)

Investigating and Evaluating Environmental Issues and Actions

An interdisciplinary environmental issues and action curriculum focused on enhancing students' responsible behavior through the examination and evaluation of real life community-based environmental problems and issues.



Description

The program consists of a series of six "modules" designed to introduce students to environmental issues, the skills needed to critically analyze and investigate issues, the skills needed for information processing, and those skills needed to evaluate and act responsibly on local issues. The curriculum can be infused into existing science, social studies, or language arts classes. In addition, it can be adopted for use in team-teaching and interdisciplinary situations. It is normally completed during one semester. Instructional activities involve students in problem-solving through a variety of interdisciplinary methods, including analyzing issues, using questionnaires to collect and record data, producing and interpreting graphs, drawing conclusions and inferences, formulating and evaluating action decisions, and developing issue resolution plans.

This program directly addresses Goals 3 and 4 of the National Goals for Education. Students learn and apply problem solving, decision making, and citizen participation skills which demonstrably contribute to good citizenship, community involvement, and personal responsibility. Similarly, science education is strengthened as students learn and apply science concepts and principles to real life problems and issues.

Students of all ability levels participating in the program show significantly greater gains in knowledge of responsible citizen action skills. Students identify more categories of citizenship action and report undertaking more actions and more types of citizenship behaviors on program-developed and validated instruments. Parents of students in the program report observing more overt citizenship behaviors on the part of their sons and daughters. The program is approved PEP for students in grades 7–8. It has also been used with students in grades 5–6.

Requirements

Materials include student edition and teacher edition worktexts. The development of a small library of issue-related videotapes, news articles, magazine articles and books is recommended, if not already available.

Two options for staff development include two, 3-day academic year inservices scheduled from 1–4 weeks apart or a 6–day summer inservice workshop. Both training formats allow participants to complete a small group issue-related assignment. During the staff development, teachers acquire and apply skills, participate in an issue investigation, prepare and communicate an implementation plan, and learn to function as consultants and facilitators to students.

Costs

Start-up costs are $10–12/student. A training manual ($16) must be purchased for each participating teacher. Continued operational costs are $9–10/year, per student, if the consumable worktext is purchased each year. All training costs are negotiable with the exception of materials.

Services

- Training and materials
- Follow-up consultation
- Graduate credit may be available

Contact

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Longmont, CO 80501
800–659–5004

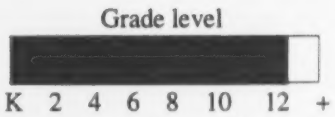
Trudi Volk
Southern Illinois University
Carbondale, IL 62901
618–453–4214

John M. Ramsey
University of Houston
Houston, TX 77204
713–743–4966

Developmental funding: National Science Foundation, Illinois Title II Grant
PEP No. 90–19R (3/29/91)

Iowa Chautauqua Program (ICP)

An inservice model for improving science teachers and science education programs.



Description

ICP provides a unique approach to science inservice education. Created out of the realization that most inservice programs fall short in terms of meeting the developmental needs of teachers, the program strives to empower science teachers to make science more meaningful and useful for their students. ICP provides ongoing support across a summer and an entire academic year to teachers in grades K–12 as they develop and assess strategies that match those which characterize a reform effort termed Science, Technology, Society (STS). STS promotes a constructivist approach to science teaching and can best be described as teaching and learning science in the context of human experience. Student ideas and thinking are used to drive the lessons.

The goals of the ICP include improving teachers' confidence in teaching science; making teachers' instruction more congruent with the features of basic science by focusing instruction on questioning, developing explanations, and devising tests for evaluating those explanations; preparing teachers to facilitate student learning in multiple domains concepts, processes, applications, creativity, attitude and world view of science—not simple memorization of facts; and developing teachers as leaders in science education reform. A comprehensive assessment methodology has demonstrated the effectiveness of the workshops in terms of behavioral change in both teachers and students. The ICP stands out as a dynamic model for others interested in transforming their science programs. The program is approved by PEP for teachers in grades K–12.

Requirements

A 3-week summer workshop for new teachers with a lead teacher to teacher trainee ratio of 1/10–15. Participants must develop, use, and assess the effectiveness of newly learned teaching skills and teaching materials. Central school staff such as state, regional, or district science supervisors and college or university faculty should

also be involved in the training and follow-up activities. A two-and-a-half-day spring short course to follow up and evaluate the success of implementation is required.

Costs

The cost of an ICP series enrolling 30 teachers is typically $46,500. Cost per student (K–12) in a classroom of 36 is about $43. Start-up costs include personnel (three lead teachers, three central staff, three scientists and others); stipends for teachers in the summer workshop; staff travel and per diem; and materials and supplies. Operational costs average about $4,000 for staff travel, per diem, and materials and supplies.

Services

- Training and related consultation
- Printed guides for leadership training, module development, changes in teaching strategies, and program assessment

Contact

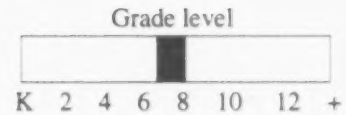
Robert E. Yager, Director
Science Education Center
The University of Iowa
Iowa City, IA 52242
319–335–1189

Developmental funding: National Science Foundation, ESEA Title 2, Eisenhower Math and Science Program, local school districts, Iowa Utility Association
PEP No. 92–5 (3/26/93)

Fourth-grade students from Fairview Elementary School in Carroll, Iowa, used calculators to determine the amount of fat in a gallon of skim milk. Photo by Butch Heman of *The Times Herald*, Carroll, Iowa.

JEFFCO Middle School Life Science Program

A program enabling students to understand the human body, basic ecological principles, and issues associated with environmental problems.



Description

This program is a full-year life science course to replace the curriculum currently being used in general or life science. It can also be used in an integrated science-health course or divided into units and used as part of a 2- or 3-year integrated middle school curriculum. Its characteristics parallel those recommended by most national science education reform groups and would assist in meeting National Education Goal 4.

Learner materials consist of a text integrating lab activities and readings. Topics were defined by life science teachers based upon their experiences with students and recommendations of nationally recognized experts in middle school science curriculum. Content is delivered in a learning cycle consisting of exploration, concept formation, and application. In the exploration stage, students carry out an experiment or investigation, introducing them to the phenomena and experiences that lead to concept development. Students then apply the concept in an application activity or discussion.

In terms of student acquisition of conceptual and factual knowledge, students in this life science course scored significantly higher on reliable locally developed tests. Higher performance of the treatment group was generalizable across ability levels, sex, and teachers. The program is approved by PEP for students in grades 7–8 of all abilities who are involved in a year-long science program.

Requirements

A typical middle school science classroom-laboratory is required. In addition to basic science equipment and supplies (including light microscopes), some unique materials are required. An inservice program of about 40 hours is strongly recommended.

Costs

For appropriately equipped schools, it costs about $800 for a classroom with the necessary equipment and nonconsumable materials (Teacher Guide, $39.90; *Teacher Resource Book*, $69.90; student textbooks, $26.90 each). Training costs are $200 for registration plus travel, room, and board for the national workshop in Colorado. Local workshops can be arranged for the

cost of presenters' fees and travel costs are about $200/participant for a minimum of 15 people.

Services

- Training is available at the program site and also at the adopter site (costs to be negotiated).

Contact

Harold Pratt, Jefferson County Public Schools
Wheat Ridge Middle School
7101 West 38th Avenue
Wheat Ridge, CO 80033
303–467–1184

Developmental funding: Local funding and National Science Foundation
PEP No. 90–04 (2/6/90)

CIGARETTE SMOKE

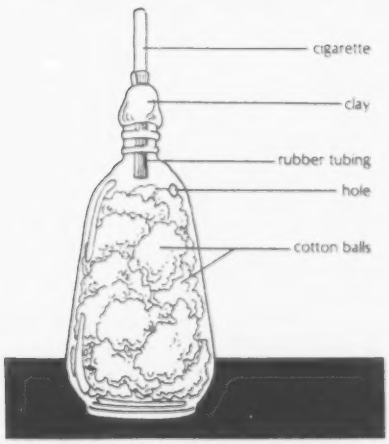


Figure 15–15 Lung model

PROCEDURE

Work in groups of two or three to do this activity.

Part A. Making a Lung Model

1. Get the materials you need to make a lung model.
2. Pull the cotton balls slightly apart in order to fluff them.
3. Fill the bottle with cotton balls. Do not pack them in.
4. Use clay to hold the tubing in the neck of the bottle. About 3 cm of tubing should stick above the top of the bottle. (See Figure 15–15.)

Part B. Practicing Breathing

Each person in your group should "practice breathing" as described.

Seventh grade students from Wheat Ridge Middle School, Wheat Ridge, Colorado, made a lung model to answer questions about cigarette smoke.

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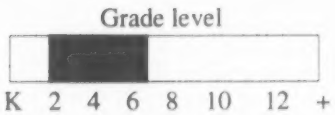
Keyboarding, Reading, and Spelling (KRS)

A program that teaches students to use a microcomputer keyboard to learn to type, read, and spell.



Description

KRS is an instructional program that enhances reading achievement and keyboard skills. The program uses a phonetic approach to reading, with the microcomputer being an essential component of the instructional process. The computer does not replace the teacher in instructing, but rather provides opportunities for students to master skills through reinforced practice. The software runs on the Apple, Macintosh, and IBM PC-compatible computers and requires a single disk drive and DOS 3.3 or higher (on IBM PCs); a color monitor is preferred, but not required. KRS can be networked.

The program works with one or more computers to a class or with a computer lab in the school. Although the teacher teaches some skills, students are independent as they work at the computer. KRS will help ensure students' competency in reading, writing, communicating, and adapting to new technologies (Goals 3 and 5). Students in grade 1, using the typewriter version of the program, demonstrate reading achievement scores, as measured by the CAT, that are higher than scores of students in a true control group, at a statistically significant level (p.01).

Students in grade 3, using the microcomputer version of the program, demonstrate reading comprehension and speed-and-accuracy scores, as measured by the Gates-MacGinitie Reading Tests, that are higher than scores of students in a nonequivalent control group, at a statistically significant level (p.01). Typewriting and computer usage skills are also statistically significant for the experimental group when compared to the control group. Visual and auditory memory skills improved significantly.

Students in grades 1–6 using KRS demonstrate reading vocabulary, comprehension, and language skills scores, as measured by the Metropolitan Achievement Test, significantly higher (p.01) than scores of control students who also spent an equal amount of time in the computer lab in other computer programs. Computer usage and typing skills are also statistically significant for the experimental group when compared to the control group.

The program is approved by JDRP for students in grades 1–6. Supporting data also were gathered from students in grades 7–8.

Requirements

A 1-day preparatory inservice education program conducted by a Reid Foundation staff person is desirable. The program includes lecture and practice sessions. It would help the trainees to have Apple, Macintosh, or IBM PC-compatible computers available. It is desired for data from pre- and posttests to be sent to the developer-demonstrator.

Costs

The basic program that includes four disks costs $180. Five sets of the four disks cost $468. Notify the Reid Foundation of the disk size (three-and-a-half or five-and-a-quarter inches) needed.

Services

- Awareness materials are available at no cost.
- Visitors are welcome by appointment at the program site and additional sites in other states.
- Program staff are available to attend out-of-state awareness meetings at no cost.
- Training can be done at the program site or at adopter sites.
- An awareness videotape is available for rental.
- At initial awareness and training sessions, time is provided without cost and expenses are negotiated.
- Training and awareness can take place the same day.

Contact

Ethna R. Reid
Reid Foundation
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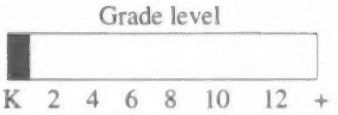
Salt Lake City, UT 84109
801–486–5083 or 278–2334

Developmental funding: Local
JDRP No. 84–14 (3/26/84) Recertified 10/30/87

Kindergarten Integrated Thematic Experiences (KITE)

A program to increase reading and mathematics achievement by promoting basic reading and mathematics readiness and language skills while helping children develop a positive self-image.



Description

KITE effectively combines child-initiated and teacher-directed activities within a planned environment. This multisensory program uses oral language, manipulatives, music, and play. The program emphasizes all areas of development—cognitive, language, physical, and social-emotional. The varied KITE experiences integrate language arts, math, art, music, literature, social studies, science, drama, and physical education. It assists teachers in moving from traditional toward developmentally appropriate practices.

Through developmentally appropriate activities, children use concrete objects, have meaningful interactions with materials, adults, and each other, using structured and informal oral language. These interactions enable children to assimilate abstract concepts. Language and interest is stimulated by the use of imaginary outer space characters—*Astro* and *Astra*.

During teacher-directed instructional time, the program uses discovery with a game-like presentation of materials and positive teacher feedback. There is positive recognition of and a belief in the ability of each child to succeed. The contents of *Astro and Astra's KITE Motivational Bag* delight children and foster teacher creativity. Literature, poem charts, and mathematics charts are used for whole language development. The program includes interactive large- and small-group activities.

The KITE program provides essential program motivation, contains lesson materials for the units, and stimulates curiosity in the children. *Astro* and *Astra* display various feelings, thus enabling the children to identify with them. The program promotes a thematic, developmentally appropriate, integrated curriculum.

Regular and at-risk students demonstrate significantly greater positive academic growth on pre-posttest models. Soft data—teacher testimonials of child success and joy of learning with *Astro* and *Astra*, imaginary outer space characters. Hard data—NCE gains (information available upon request). The program is approved by PEP for both kindergarten regular, and academically disadvantaged students (Chapter 1 and at-risk). The main components of this program have been used successfully for migrant, special education, bilingual education (Spanish) and ESL students in primary grades. It is used in all 50 states, American Samoa, Guam, Saipan, and nine foreign countries.

Requirements

The program can be used by a single teacher, whole school, or entire district. A 1-day training session is required for adoption.

Costs

There is a one-time start-up cost for basic nonconsumable materials per classroom. Additional materials to enhance the program are available. Costs for materials—start-up (one-time expenditure) is $134.50/classroom. Awareness is negotiable. Costs for training—1-day expenses and honorarium $300 (negotiable); 2-hour training video is no charge (30-day loan).

Services

- Written awareness materials, a 50-minute video, and grant-writing packets are available.
- Program staff are available to attend out-of-state awareness meetings.
- Many demonstration sites and certified trainers are also available. Training is conducted at the program or adopter site.
- Implementation and follow-up services are available to adopters (costs to be negotiated).
- A 3–4-day certified trainer workshop is held annually in the San Francisco area in the last week of June.

Contact

Jeanne Stout Burke, Director
KITE
Sunshine Gardens School
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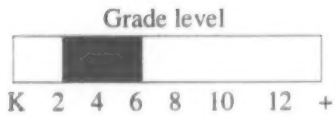
South San Francisco, CA 94080
415–588–8082

Developmental funding: Local
PEP No. 90–11 (2/9/90)

Life Lab Science Program

An applied science program emphasizing a hands-on, garden-based "living laboratory" approach to elementary science.



Description

The Life Lab Science Program strives to ensure students' future interests and success in science by improving student attitudes toward the study of science and increasing students' level of knowledge and skill acquisition in science. Instruction is a combination of indoor and outdoor hands-on science activities with the key component being the garden lab (e.g., indoor grow box, greenhouse, planter boxes, vegetable beds, etc.). Students and teachers collaborate to transform their school grounds or classrooms into thriving garden laboratories for the application of scientific processes. Students conduct experiments using the scientific method, observing, collecting, and analyzing data. They establish worm colonies, raise vegetables, herbs and flowers, and have responsibility for maintaining their living laboratory. A structured course of study is followed in science, nutrition, and gardening. Instructional time varies from 2–4 hours a week.

Elementary students demonstrated significant gains in science achievement as evidenced by the California Test of Basic Skills Science Subtest and the SAT and MAT in science achievement. The program also fostered positive attitudes towards the study of science at all elementary grade levels, based on student surveys. It is approved by JDRP for elementary students, grades 2–6.

Requirements

The critical learner setting is the "living laboratory" whether an indoor grow box, containers adjacent to the classroom, a greenhouse, or a three-acre school farm. The primary curriculum guide is *The Growing Classroom*, which contains science, nutrition, and gardening units, and is accompanied by a scope and sequence. Prior to use the project has a 2-day workshop at the school site or project site that prepares teachers for using the project, teaching techniques, and the "living laboratory" approach. Following the initial training, staff development and project use become the responsibility of lead teachers in each school. Advance

training is available and technical assistance will continue to be provided throughout the installation year.

Costs

The adopter is responsible for travel and per diem costs. Trainer fees are to be negotiated. Implementation costs vary by site and the extent of "living laboratory" development. The curriculum must be purchased for each teacher.

Services

- Awareness materials are available at no cost.
- Visitors are welcome by appointment to visit project sites in their home state or out-of-state.
- Project staff are available to attend out-of-state awareness meetings (costs to be negotiated).
- Training is conducted either at the project site or the adopter site (costs to be negotiated).
- Follow-up technical assistance is also available.

Contact

Lisa Glick or Gary Appel
Life Lab Science Program
1156 High Street
Santa Cruz, CA 95064
408–459–2001 FAX 408–459–3483

Developmental funding: ESEA Title IV–C; Packard Foundation; California State Department of Education; National Science Foundation
JDRP No. 86–17 (9/10/86)

Fifth grade students from Robert F. Kennedy School, San Jose, California, observing the drainage capacity of different types of soil.

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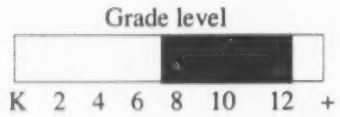
Marine Science Project: FOR SEA

A comprehensive, activity-oriented, marine science curriculum that teaches basic science skills and knowledge on or away from the coast.



Description

By the year 2000, three out of four Americans will live within an hour's drive of the sea or Great Lakes coasts. The impact on these coastal waters will be severe. The nationally validated curriculum materials of FOR SEA are designed to equip students with information necessary to make responsible decisions about the marine environment.

FOR SEA provides comprehensive, activity-oriented, marine education curriculum to be used in addition to or in lieu of an existing science program. The magic draw of water provides incentive to teach and learn science. Close proximity to seawater is not necessary to use this curriculum. Curriculum guides are available for the following grade levels: 7–8 and 9–12 (Part I: Physical Oceanography, Part II: Marine Biology and Issues). Each guide contains teacher background for each activity, student activity and text pages, answer keys for student activities, and a vocabulary list for each unit. The program is approved by JDRP for all students, grades 7–12.

Requirements

FOR SEA is designed for room, grade, school, or districtwide level. Inservice training provides teachers with an overview of the project, procedures, and hands-on activity sessions to familiarize them with the materials. Training can be provided for groups of 10-32 educators, meeting for a minimum of 6 contact hours, but preferably for 2 days of inservice. Training agendas can be tailored to serve specific grade levels or to include teachers for all grades 1-12. (Please see listing for FOR SEA: Investigating Marine Science, grades 1-6.)

Costs

A copy of the appropriate grade-level curriculum guide must be purchased for each implementing classroom teacher at $35.00/guide. Student text materials in the guide are designed to be reproduced by the adopting sites. Hands-on materials are generally

found in the school setting or are readily available at local grocery, variety, or pet stores. Start-up costs vary by site.

Services

- Awareness brochures and samplers of curriculum are available.
- Project staff or certified trainers can deliver awareness sessions with negotiable cost-sharing.
- Inservice training is provided at the adopting site.
- Negotiable costs include: trainer's honorarium, travel, and per diem.
- Follow-up services are provided by the project, based on site needs.

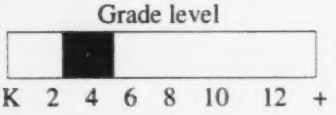
Contact

Marlene C. Holayer
Assistant Superintendent, Curriculum and Instruction
Olympic Educational Service District 114
105 National Avenue North
Bremerton, WA 98312
206–479–0993

Developmental funding: USOE ESEA Title IV–C
JDRP No. 83–26 (3/28/83) Recertified 4/9/87

Mathematics Achievement Program (MAP)

A pull-out remedial mathematics program.



Description

To help students overcome difficulties in computation concepts and application skills, eligible students are scheduled into centers and provided instruction through a diagnostic-prescriptive system. Scheduling students is a cooperative effort of the Chapter 1 teacher and the regular classroom teacher that insures daily instructional sessions without interruption of classroom mathematics or supportive instructional electives, and no more than one interruption weekly of all other major subject areas. The Chapter 1 teacher incorporates pupil needs revealed in the classroom with needs diagnosed in the center to promote maximum learning.

Using a composite analysis of several criterion-referenced achievement tests, an individual mathematics profile is developed for each student. Behavioral objectives are used to formulate a prescription to meet each pupil's interests and needs. The *Cross-Reference Guide* supplies information on materials available in every center to be used in remediation of a stated skill. Each MAP Learning Center is staffed with a certified elementary teacher and aide who serve about 62 pupils. Thirty-minute instructional sessions are conducted in small groups; teacher-pupil ratio is 1/66. The program is approved by JDRP for the educationally disadvantaged children, grades 2–5.

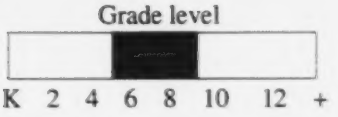
Contact

John W. Williams
Mathematics Achievement Program
Chester Upland School District
18th and Melrose Avenue
Chester, PA 19013
215–447–3860

Developmental funding: USOE ECIA Chapter 1
JDRP No. 82–39 (7/22/82)

Mathematics Achievement Through Problem Solving (MAPS)

A complete 1-year curriculum to increase the problem-solving ability and the conceptual understanding of mathematics in general mathematics students.



Description

MAPS is designed to replace first-year secondary general mathematics. The curriculum is grounded in the constructivist perspective, therefore, students build conceptual frameworks while they are engaged in activities requiring problem solving and decision making. The teacher functions as a facilitator rather than a disseminator. Extensive use of investigations and small-group problem solving enable students to construct generalizations of mathematical concepts and relationships. Students also learn to use calculators and computers as problem-solving tools. Learning materials consist of 10 strands, including estimation and mental arithmetic, heuristic problem solving, number concepts, spatial visualization, probability, statistics, measurement, applied problem solving, intuitive algebra, and computer problem solving. This program strengthens mathematics education, which is part of the first objective of the national goals for science and mathematics education.

Students participating in the program score significantly higher on a project-developed and validated criterion-referenced test of problem-solving ability, achieve consistently higher ratings in a content analysis of their work on the posttest, and score higher overall on the Indiana Statewide Test of Educational Progress (ISTEP) Mathematical Concepts and Applications subscore than comparison students in traditional general mathematics classes.

The program is approved by PEP for first-year secondary general mathematics students (typically in grade 9).

Requirements

A 5-day intensive workshop for teachers focused on understanding collaborative learning, the problem-centered curriculum, the constructivist perspective, and the classroom atmosphere needed to use the program is required. Regular meetings with other MAPS teachers and attendance at a 1- or 2-day follow-up conference a year later is highly recommended.

Costs

Training costs consist of $1,600 plus travel expenses for presenters' fees and $50/participant (typically 20 people) for workshop materials. Duplication expenses are $8/student the first year and $4.50/student in subsequent years. Manipulative expenses vary.

Services

- Training and materials
- Newsletters
- Exchange visits
- Follow-up meetings
- Consultations
- Classroom visitations

Contact

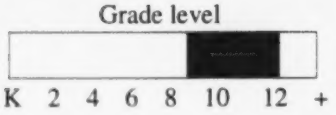
Jean Boddy, Mathematics Education Specialist
Department of Curriculum and Instruction
1442 Engineering Administration Building
Purdue University
West Lafayette, IN 47907–1442
317–494–0803

or William C. Kyle, Jr.
317–494–5889

Developmental funding: Indiana Commission of Higher Education, Indiana Department of Education, and School Mathematics and Science Center at Purdue University
PEP No. 92–6 (3/92)

Mechanical Universe: High School Adaptation

A series of 28 high school-level study modules for teachers and students to reinforce the major topics and concepts covered in most physics textbooks.



Description

This program presents an innovative approach to motivating students toward mastering a conceptual understanding of physics. After the appropriate introduction by the teacher, a 15– 20-minute videotape can take the student from a view of Newton working at his desk to close-ups of complicated experiments or modern nuclear laboratories, from animated cartoons of gravitational effects to three-dimensional computer graphics that come alive, making the abstract concepts of physics more understandable. These visual images, in a historical concept, prompt the student's memory, imagination, and understanding as the narrative develops the typical (and not so typical) concepts of high school physics. The audiovisual materials in conjunction with the written teacher's and student's guides, encourage repeated viewings for an ever deepening comprehension of the topics presented.

The comprehensive written teacher's guide includes a specific plan of the instructional procedures for the effective use of each module, supportive background information to assist teachers in their own understanding of the physical concepts, questions to explore common applications of the concepts, and test questions for the assessment of student understanding. These materials can replace traditional material being used for most physics topics typically presented in high school. The 28 topics available cover all but a very few topics contained in a traditional physics course, with some that are new to the typical course, such as Navigating in Space.

Comparative studies between traditional materials and this program revealed the Mechanical Universe: High School Adaptation students express a greater interest in taking physics, as well as an improved confidence they can succeed in physics. Students in this program produced results with a mean score 11 percentile points

higher than those using traditional materials. The program is approved by PEP for all high school physics teachers and students.

Requirements

A 4-day workshop is available for use by teachers with a college major or minor in physics and 5 or more years of teaching experience. Those teachers with less experience and/or college physics should take part in a 15-day workshop.

Costs

Purchase cost for the 28 modules is $525, including all videotapes, teacher's and students' guides, and duplication rights for the school. If the adopting site does not have a videotape player and monitor, they must be acquired separately.

A sample module including the video and written materials can be obtained at no cost.

Services

- The program demonstration site is open to visitors by appointment.
- Awareness and training workshops are available with costs to be negotiated.

Contact

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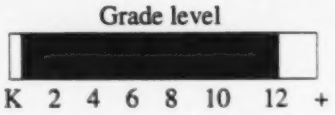
University of Dallas
1845 East Northgate Drive
Irving, TX 75062–4799
800–526–8472

Developmental funding: National Science Foundation
PEP No. 88–18 (11/1/88)

More Effective Schools/Teaching Project

A program to increase academic achievement for all students and to improve the organization and delivery of instruction in schools throughout a district.



Description

The project addresses the needs of improving achievement in the basic skill areas for all students and reducing the achievement gap between minority and nonminority students through training district-level, multirole planning teams and building-level, multirole school improvement committees. Teams and committees are trained to implement and maintain a data-based, data-driven school improvement program based upon the effective schools research. Annual plans are based on desegregated student outcome data and the results of a survey of faculty perceptions regarding the presence of correlates of effective schools.

Over a 7-year period, there was a continued and significant increase in the proportion of students in the participating district scoring at or above the 40th percentile and in stanines 7–8–9 on the Stanford Achievement Test in Reading Comprehension and Total Mathematics; and the participating school district demonstrated significant improvement on the New York State Educational Department Regents Exams in Math 9, Math 10, Math 11, Earth Science, Physics, and French. Improvements in institutional practices sustained over 7 years included district adoption of new student outcome goals measured by standardized tests; creation of an on-going process for problem solving formation of school improvement committees giving leadership roles to teachers; and attainment of the correlates of effective schools in participating schools. The program is approved by PEP for all types of school districts.

Requirements

The project requires active, visible endorsement and support by the district superintendent; designation of a district project coordinator; participation of appropriate teachers and administrators on the district leadership team, on school improvement committees, and in the training workshops; annual disaggregation of student achievement data and administration of a correlate needs

assessment instrument; annual development of building school improvement plans and approval of them by the faculty; and preparation and publication of an annual evaluation report.

Costs

Costs vary according to district size, pay rates, and the amount of travel incurred by consultants. Assuming a five-building school system with pay rates comparable to the validation site, start-up costs are estimated at $8,140/school and the annual operation cost at $9,150/school.

Services

- Training and curriculum materials
- Follow-up consultation

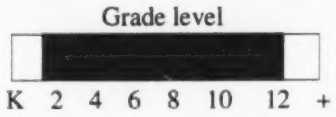
Contact

Robert E. Sudlow
Spencerport Central Schools
71 Lyell Avenue
Spencerport, NY 14559
716–352–0603

Developmental funding: State and local
PEP No. 91–24 (4/92)

National Faculty Teaching Project

A program to strengthen the quality of instruction by encouraging professional growth among teachers and increasing knowledge of disciplines.



Description

The National Faculty's mission is to improve the teaching of the humanities, arts, and sciences in elementary and secondary schools through a process of staff development by which school teachers and college professors work together on the disciplines they teach. The National Faculty builds an internal school structure to permit the collaboration of the teachers with national scholars and scholars from nearby colleges and universities. Each project gives a school or district the chance to implement a systematic method for improving discipline-based instruction and to utilize the resources of the nation's only national faculty. This faculty, comprised of about 500 scholars and teachers from almost as many colleges and universities throughout the country, is a unique feature of the dissemination process.

Although each project is tailor-made for an individual school setting, a common pattern of activities is developed at each site. These activities include the identification of a core group of teachers fashioned into a collegial unit; development of a detailed project plan implemented over a period of time, ideally 2 or 3 years; a succession of 2-day visits on site during the school year from college and university teachers who are members of The National Faculty; participation in summer institutes; sustained attention to subject matter and to the primary texts and concepts of specific disciplines; the collaboration with faculty from local colleges; and an emphasis on local ownership of the project by the teachers, with plans for continuing and expanding its impact. Although projects are managed by The National Faculty staff, over time they become self-generating and self-directed. By adding to teachers' academic resources in all subject areas. The program addresses Goals 3, 4, and 5 of the National Goals for Education. It is approved by JDRP for all elementary and secondary schools.

Requirements

The process disseminated by The National Faculty has been selected using criteria developed over the last two decades. Through a process of trial and error the following criteria have evolved: projects are conducted on site; a project team is formed; and a project plan is developed based on an assessment of the school's academic needs. A project usually lasts at least 2 years and includes a summer institute between the first and second years of implementation. A typical project framework involves a variety of interconnected components that must be developed and monitored for the duration of the project. These include: initial contact; application and contract for planning; planning phase; project development and activities; and monitoring and evaluation.

National Faculty projects have been established in almost every education setting, including rural, urban, suburban, rich and poor, and for minorities of nearly every ethnic group. Because of the flexibility of the process and the extensive membership of The National Faculty, there is no limit to the number of projects which can be developed. The major accomplishment of the process has been its beneficial effect on teachers, resulting in multiple changes: changes in teachers' attitudes about reaching; changes in understanding the subjects they teach; changes in their professional relations with their colleagues; and changes in the institutional arrangements with which they work at school and through collaboration with nearby colleges. At the heart of this renewal process is a change in what teachers expect of intellectual inquiry, academic colloquy, and professional esteem, all of which lead to more effective teaching. These results have been documented in qualitative evaluation studies conducted by the University of Illinois and University of Colorado.

Costs

Project costs are recurring and vary greatly according to determined needs. A project may begin with several months of planning for as little as $10,000, which can lead to the development of a project of any size. A small project in a school district including three or four schools may cost $90,000 over 2 years. A larger project involving many schools may cost $600,000 over 3 years, with similarly distributed cost categories.

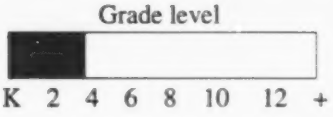
Contact

Andrea Fowler
The National Faculty
Healy Building, Suite 300
57 Forsyth Street
Atlanta, GA 30303
404–525–0525

Developmental funding: National Endowment for the Humanities
PEP No. 87–19 (5/15/87)

Pablo Python Looks at Animals

An introductory science curriculum for children of all ability levels combining classroom instructions and the scientific resources of zoos to teach fundamental science skills.



Description

This program uses a multimedia approach that encourages young children to explore the world, using all their senses. It meets the National Goals for Education by addressing the need for more and better ways to teach science and observation skills. Pablo Python capitalizes on children's natural curiosity and love of animals and provides a focus and foundation for future learning and caring as it helps children develop self-esteem, competency, and curiosity. It can be used as the entire science curriculum or a supplement, and may also be used to enhance the early childhood curriculum. The program consists of six books, an audio tape of animal sounds, and a videotape on animal diversity growth and behaviors. Each is devoted to a different science topic. Each topic can be divided into units, with two to six lessons per unit. Lessons range from 30–90 minutes and begin with a question, song, game, poem, or story.

Students in the Pablo Python curriculum program demonstrate a significant increase in acquisition of basic science concepts on program-developed and validated mastery scales and criterion-referenced tests and a significant increase in their understanding of zoos as places to study nature and science. Teachers gain confidence in using the zoo as a science resource, increase their instructional repertoire, teach more specific science concepts, and teach science significantly more minutes a week. The program is approved by PEP for students in grades K–3.

Requirements

The classroom teacher determines how much time to devote to a topic and to what depth it will be explored. Teacher training consists of 6–12 hours of workshop training. During training, teachers receive student materials, are given detailed instructions and lesson plan suggestions for using the program in the classroom and at the zoo, actually participate in student activities, and discuss classroom management of the program.

Costs

The Teacher's Kit and Classroom Kit curriculum materials cost about $150 and include the book series, videotape, audio cassette, activity sheet masters, teacher's manual, and supplemental materials. Teacher Training Workshops, at regional sites or locally upon request, for 15–20 teachers with one staff trainer cost $155/day/trainer, plus travel expenses. The total start-up cost estimate is $150/teacher. Additional costs might be associated with zoo visits.

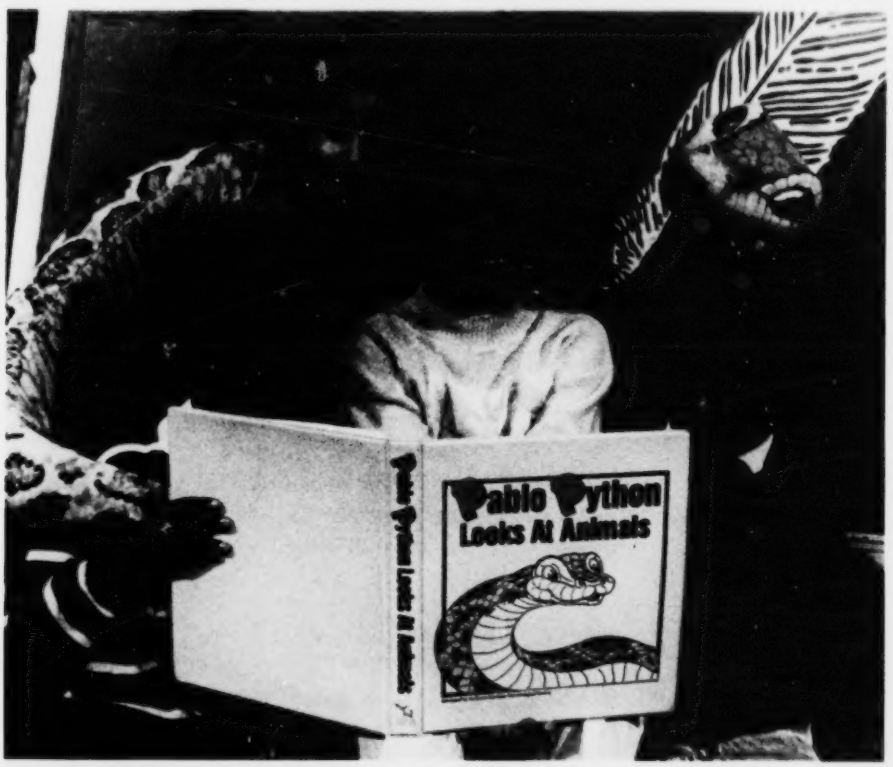
Services

- Training and materials
- Follow-up assistance

Contact

Annette Berkovits, Director of Education and Program Director
or Julie Gantcher, Program Dissemination Coordinator
Bronx Zoo
185th Street and Southern Boulevard
Bronx, NY 10460
718–220–5135, 220–5131 or 800–937–5131

Developmental funding: New York State Council on the Arts, Samuel and May Rudin Foundation, Louis Calder Foundation, and Liz Claiborne Foundation
PEP No. 91–7 (3/14/91)



Elementary school students from P.S. 205 in the Bronx, New York.

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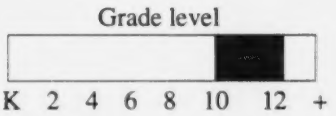
Physics Resources and Instructional Strategies for Motivating Students (PRISMS)

A comprehensive physics program that stimulates students to develop reasoning and problem-solving skills.



Description

PRISMS blends exploratory activities, concept development, and application activities into a learning cycle. The concepts addressed are those typically included in most high school physics courses including kinematics, dynamics, work and energy, internal energy and heat, wave phenomena, electricity and magnetism, and atomic and nuclear physics. High interest activities involving cars, bicycles, balloon rockets, dart guns, and boats are used to teach the major concepts in physics.

During one academic year of physics instruction, students in grades 10–12 showed a significantly greater gain in physics achievement relative to a comparable control group that used conventional materials and teaching strategies. Gain was measured using two forms of the New York Regents Physics Examination on a pre-posttest basis. In addition, PRISMS students had higher gains in reasoning and science problem solving skills compared to a control group which used conventional materials and strategies. Change was measured by using two forms of the Test Integrated Process Skills (TIPS II) on a pre-posttest basis. The program is approved by PEP for students in grades 10–12 with backgrounds in beginning algebra, especially for those students who need additional motivation to learn the concepts and practical applications of physics.

Requirements

To implement the program, the normal science laboratory facilities should be available. Several optional activities are provided that use computers for data acquisition. The physics teacher should understand the teaching strategies and be familiar with many of the activities before starting the program. Inservice training for 1–3 weeks is highly desirable.

Costs

PRISMS materials include the *Teacher Resource Guide*, two videotapes, and a test bank of questions for evaluating student learning at a cost of $150. Assuming 15–20 teachers attend a 1-week training period, the cost is approximately $130/ teacher.

Services

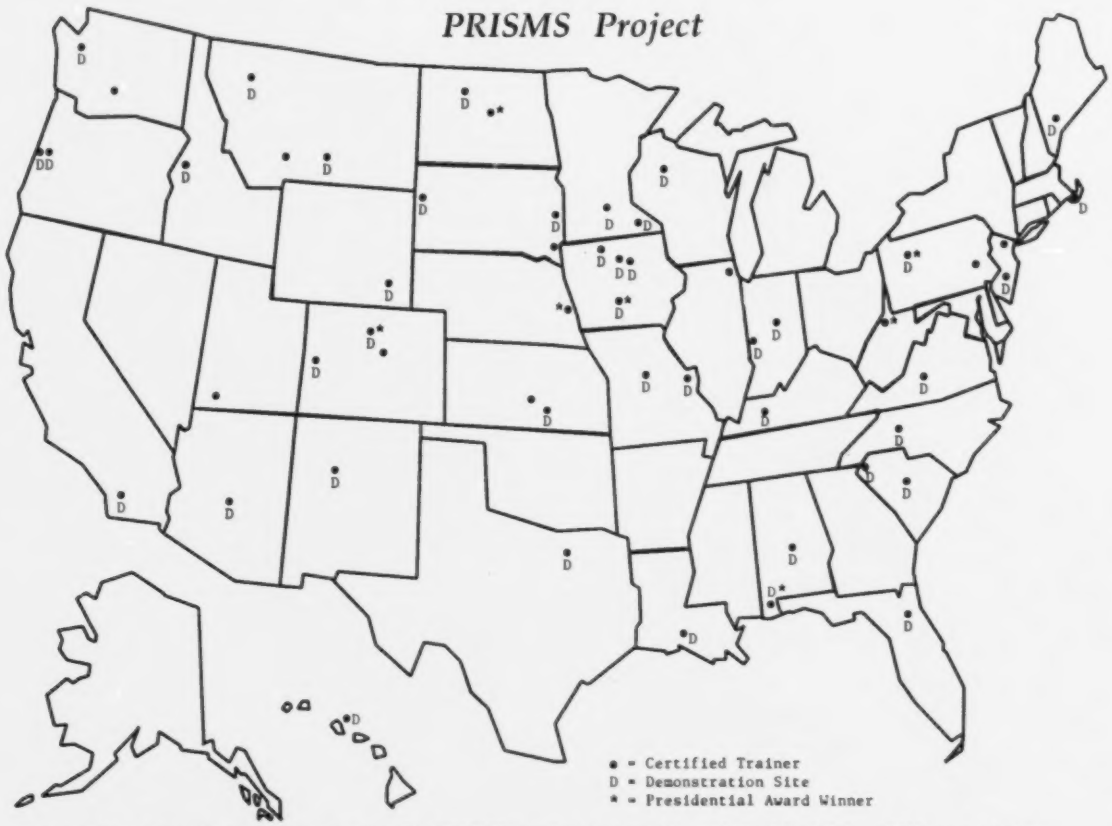
- Awareness materials are available at no cost.
- Training is conducted during the summer at the development site at the University of Northern Iowa.
- Staff are available to conduct workshops at other locations with costs to be negotiated.
- For demonstration sites available for visitation near you, contact the PRISMS program office.

Contact

Roy D. Unruh
PRISMS
Physics Department
University of Northern Iowa
Cedar Falls, IA 50614
319–273–2380

Tim Cooney
Earth Science Department
University of Northern Iowa
Cedar Falls, IA 50614
319–273–2918

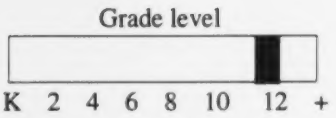
Developmental funding: Iowa Department of Education and U.S. Department of Education, Secretary's Discretionary Fund
JDRP No. 87–4 (5/28/87)



Map indicates PRISMS demonstration sites (D), PRISMS certified trainers (o), and Presidential Award Winners who are PRISMS certified trainers (*). The Presidential Awards for Excellence in Science and Mathematics Teaching program was established in 1983 by The White House and is administered by the National Science Foundation.

Physics—Teach To Learn

A program using computer simulations of the physics concepts that are the most difficult to teach.



Description

This program provides teachers and students with instructional materials and processes that facilitate the exploration and illustration of physical events students frequently misunderstand and teachers find difficult to illustrate in the classroom. The program then tests the students' understanding and ability to make application of the physics concepts underlying those events.

The program's 23 instructional modules, each with teacher-controlled computer simulations and supporting curriculum materials, were developed by a committee of Los Angeles Unified School District master physics teachers with university support. They were designed to provide students with fundamental and qualitative understanding of physical events in selected topic areas. The computer simulations require the learner to make a judgment about a physical event. This judgment, based upon learner experience or observation, often reveals misconceptions based upon defective logic.

After the initial judgment (pretest), the teacher then uses the computer simulation(s) to lead the student through the steps of exploration, development, and application. By using this step-by-step method, the teacher is best able to guide the correction of student misconceptions about the physical events under consideration. After this process has been completed, the student takes a formal paper-and-pencil posttest. Each topic is accompanied by extensive written curriculum material designed to enhance the teacher's ability to present the key concepts. The program also enables the teacher to have the computer print any screen display, both text and graphics, to generate additional student activity materials. The program meets National Education Goal 4 by strengthening science education and increasing the number of students who complete high school physics.

A "one group-pre-post" design was used to measure changes stemming from the intervention of the Physics—Teach To Learn program. The results provided compelling evidence that the program consistently influenced students' interest in and understanding of physics concepts. The program is approved by PEP/JDRP for physics students in grade 12.

Requirements

The instructional modules developed by the program adaptable to any course approach and compatible with any textbook. The materials for the 23 content modules in the program's curriculum package have been assembled to facilitate dissemination and use. The package includes five-and-a-quarter inch computer disks that are designed only for use with the Apple IIc, IIe, and IIGS, a graphics printer, and a monitor. This software can also be run on an Apple IIc+ computer equipped with an external five-and-a-quarter inch drive. For classroom use, a 19-inch (or larger) television is recommended to display the simulations. No prior computer experience is necessary to effectively use the program's computer software or curriculum materials. Experienced physics teachers can be trained in the philosophy, content, and use of the modules in one day. It is recommended that new and "crossover" teachers have access to 2 days of training.

Costs

The Physics—Teach To Learn curriculum package is available for a cost of $325 plus shipping and handling. The program does not charge a training fee. Once the training has occurred and the package has been purchased, there are no other program costs to the user.

Services

- Awareness materials are available at no cost.
- Visitors are welcome by appointment at the program's demonstration sites.
- Program staff are available to conduct inservice training workshops.
- Training can be conducted at the program site or at sites selected by potential adopters or by NDN state facilitators.

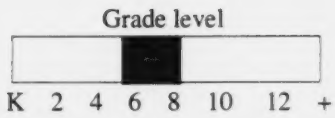
Contact

Pamela Williams, Director or Charles Schleiden, Disseminator
Los Angeles Unified School District
Physics—Teach To Learn
Bell High School
Bell, CA 90201–3201
213–773–2408 or 560–1800 FAX 213–560–7874

Developmental funding: ECIA Chapter 2
JDRP No. 86–16 (9/25/86)

Polar Regions

An innovative, interdisciplinary science program for middle grade students emphasizing an investigative and problem-solving approach to the study of meteorology, oceanology, geology, and exploration of the earth's Arctic and Antarctic regions.



Description

Polar Regions supplements and reinforces science and social science curriculums and replaces outdated content areas related to the polar regions without requiring additional instructional time. It provides instructional materials for students and resource information for teachers to pursue a problem-solving, investigative approach to topics in: geology, meteorology, oceanology, biology, and the social sciences. The development and application of critical thinking skills and the involvement of laboratory activities are emphasized to develop scientific content and concepts. Concepts are developed and reinforced relating to global geography and the exploration of the polar regions. The project's curriculum is divided into four units of instruction: Climate, Oceans, Land, and Discovery and Exploration.

Students participating in the program at grades 5–8 make significantly greater gains in science knowledge and concepts on project-developed and validated criterion-referenced lists than comparison groups covering the same knowledge and concepts using traditionally available curriculum materials. The program is approved by PEP for students in grades 5–8.

Requirements

The program may be taught in self-contained or departmentalized classrooms by science, social science, or environmental education teachers. Each of the four project curriculum units require an average of 2–3 weeks of instruction or 10–15 1-hour periods, depending upon student needs and instruction methodologies used. One 6-hour inservice workshop is sufficient to prepare teachers for effective program implementation.

Costs

The program's complete curriculum package is comprised of four instructional units, each with its own Teacher's Guide and classroom set of 30 nonconsumable packets of Student Background Information and Investigations. Twelve 11" x 14" Antarctica Study Prints and one Antarctica Filmstrip, both with Background Information and Discussion Questions, accompany the project's printed materials. The complete Curriculum Package, whose four units of instruction can be "modularized" to serve four separate classes of 30 students each at one time, is $1,050. A Teacher's Edition of the Curriculum Package with only one copy of all program printed materials, without the study prints or the filmstrip, is $100.

Services

- Training and materials.
- An awareness packet is available at no cost.
- Visitors are welcome to visit the project's demonstration school site by appointment.
- Training workshops can be conducted either at the project site or at sites selected by potential adopters or by NDN state facilitators.
- Project staff is available to attend awareness meetings out of state with costs to be negotiated.

Contact

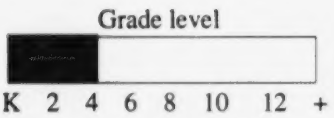
Donnalyn Jaque-Anton
Director of Professional Development
Los Angeles Unified School District
450 North Grand Avenue
Los Angeles, CA 90012

Milton Anisman, Disseminator
Environmental Programs Center
6625 Balboa Boulevard
Van Nuys, CA 91406
818–997–2389

Developmental funding: ESEA Title IV–C and district
PEP No. 91–21 (4/3/91)

Precision Teaching Project

A model to remediate and build basic skills in math, reading, and spelling by setting performance aims, practice sessions, continuous measurement, and data-based decisions.



Description

The Precision Teaching Project is composed of a set of measurement and practice procedures designed to facilitate instructional decisions while at the same time developing strong basic skills. As a measurement tool, the program can be used to monitor and make decisions with any teaching technology, methodology, or style. As a practice procedure, Precision Teaching moves students from acquisition, to mastery, to proficiency. One-minute repeated practice sessions build tool skills as well as basic skills. The following five steps guide the process:

- Pinpoint a specific academic behavior.
- Select a specific practice sheet that correlates with the current curriculum, set a specific performance standard, and then conduct a series of 1-minute practice sessions.
- Score and chart the number of correct and error responses.
- Make data-based curricular decisions.
- Develop management plans for both individual and group programs.

The program is approved by JDRP for all students (regular and special education), grades K–4.

Costs

The costs to the adopter include: Training Manuals, $15/person, Classroom Implementation Kits, $30/classroom, Set of Mathematics and Language Arts Practice Sheets (about 2,000 sheets), $197/school, and training fee, $500/day. Total training and implementation costs average $80/teacher or $3/student. In addition, the adopter is responsible for travel, lodging, and per diem. An adoption commitment can be made by a district, school, or classroom. Adopting units should include building or program administrator, support personnel, regular teachers, or special

education teachers. Initial training can be completed in 1 day and is conducted at the adopter site. A follow-up visit is strongly recommended.

Services

- Awareness materials are available at no cost.

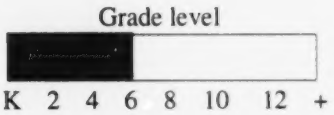
Contact

Ray Beck, Project Director
Precision Teaching Project
Sopris West, Inc.
PO Box 1809
Longmont, CO 80502–1809
303–651–2829

Developmental funding: USOE ESEA Titles III and IV–C
JDRP No. 75–25 (5/6/75) Recertified 5/17/79

Project Career Awareness Program (Project CAP)

A program for infusing career awareness into the regular curriculum, emphasizing the relationship between careers and basic academic skills.



Description

The CAP program is designed to complement the basic skills curriculum of the school while introducing students to the wide variety of ways in which people work. At the same time, students are able to grow in awareness of themselves in relation to the world of work. Project CAP student materials at each grade level consist of 32 different lessons and learning activity packets. Each learning activity packet contains an academic skill and a career script or story that presents the required tools, tasks, education, or training and economic rewards as well as the concept that work is a way of life.

For example, with one packet grade 4 students learn about the job of a land surveyor and practice a metric measurement skill as part of their mathematics program. The skills range from those in reading and mathematics, to those in science, social studies, and language arts. Packets may be completed in as little as 20 minutes or may be expanded to cover a longer unit of time depending on the lesson and the individual teacher's plan.

Students participating in the program are significantly more aware of careers than comparable nonparticipating students as measured by a project-developed and validated, criterion-referenced test of knowledge of occupations and the training or education required to enter them. The program is approved by PEP for students in grades K–6.

Requirements

Project CAP requires no special staff or facility. Teachers at potential adopting sites are required to attend a 4–6-hour training session and to purchase materials.

Costs

Start-up cost is about $130 to cover materials and supplies for a class of 25 students, plus a one-time training expense to cover travel, per diem, and a $200 honorarium.

Services

- Training and materials
- Follow-up consultation on request

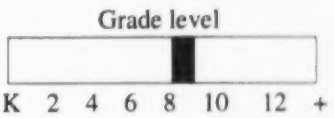
Contact

Lena Sparkman
Coordinator Project Career Awareness Program
Boston Mountain Educational Cooperative
P0 Box 13
Greenland, AR 72737
501–443–3336

Developmental funding: USOE ESEA Title III and local
PEP No. 78–178R2 (3/11/93)

Relationships and Math-Friendly Physical Science (RAMPS)

A 1-year physical science program to enable students to use and understand equations as they apply to science and to use this knowledge to do mathematical problem solving.



Description

RAMPS provides its innovative curriculum materials in a book that covers the usual topics in a 1-year, grade 8–9 physical science course. Special materials include sections written about organization of knowledge, mathematical procedures used in science, relationships, proportionality, equations, and how equations show relationships. The material is introduced gradually and applied to the science topics so as to foster the student's perception that mathematics is useful as an aid to understanding in a science course. The book provides complete instruction including questions at the end of each subsection that focus attention on key ideas and provide practice in applications. Many hands-on activities are interfaced directly into the text. Many subsections are marked "optional," allowing the teacher to cover all required topics or, if there is no required syllabus, to choose those topics most preferred by the teacher and most suitable for the students' interests or abilities.

This program addresses Goal 4 of the National Goals for Education by strengthening science education regardless of sex, especially through mathematical understanding and by increasing the substantive background of teachers in science and in mathematics applied to science.

Students in grades 8–9 participating in RAMPS demonstrate higher levels of understanding of the relationship between mathematics and science on a program-developed and validated test than comparison students in a traditional physical science course. The program is approved by PEP for students in grades 8–9.

Requirements

RAMPS material can be taught by any certified teacher of physical science, even if not mathematically prepared or knowledgeable. Teachers can easily learn the special material by reading the RAMPS book, using the teacher's guide, and doing the problems and questions. A minimum of 1 day of training is needed to impart the philosophy of instruction, provide an overview of the mathematical components, discuss how to use and adapt the materials, and perform hands-on activities. The book can be used either as the student textbook or as a source book and guide for the teacher in interfacing the RAMPS material with the physical science textbook already in use.

Costs

Training, travel expenses, and the RAMPS sourcebook, including a teacher's guide, cost $65. Operational costs total $4 to cover supplies for a class. Student textbooks may be obtained by arrangement with the program.

Services

- Training
- Curriculum
- Awareness materials

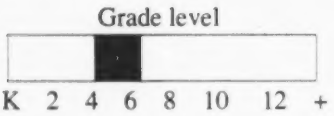
Contact

Madeline P. Goodstein
PRIMAK Educational Foundation
PO Box 701
Devon, PA 19333
215–687–6252

Developmental funding: Addison-Wesley Publishing Company and local
PEP No. 91–1R (4/8/91)

Save For America

A program to teach students basic principles of personal economics during social studies and to help them practice their skills by participating in a school-based program.



Description

Save for America is a school-based savings program sponsored by a bank but run by adult volunteers. Its purpose is to reinstitute the savings habit in America's youth.

- Deposit Process
  Students Bank at School. Bank Day is before school once a week. To make a deposit, students bring their money and savings register on Bank Day. Using Save for America software, and with adult supervision, students key in their deposit on the school's Apple or IBM computer. With a computer generated receipt, a sticker, and the deposit recorded in their savings register, it's off to class for the new generation of savers.

  Electronic Data Processing. A Save for America data disk goes to the bank for processing. At the bank, a special program checks the disks for accuracy and prepares the deposits to be sent to the bank's mainframe computer or service bureau.

- Classroom Studies
  Program Materials. Making a deposit is not enough to firmly establish the savings habit in the minds of American children. A curriculum has been designed to teach children why saving is important, how to save, and the mechanics of saving. This U.S. Department of Education approved curriculum is designed for use by teachers or parents.

- Incentives for Savers
  Each time students make a deposit of any amount they receive a Save for America sticker to remind them to save again.

The program is approved by PEP for all students, grades 4–6.

Requirements

Sponsoring bank

Costs

Bank pays all costs.

Services

- Awareness materials are available at no cost.
- The program staff is available for awareness sessions (costs to be negotiated).
- Implementation and follow-up services are available to adopters (costs to be negotiated).

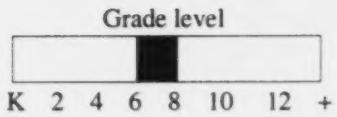
Contact

Sherry Avena
4095 173rd Place, SE
Bellevue, WA 98008
206–746–0331 FAX 206–562–8780

Developmental funding: Private sector initiative
JDRP No. 85–6R (4/2/85) Recertified /5/92

Science-Technology-Society: Issues and Solutions (STSIS)

A semester curriculum that focuses on the interrelationships among science, technology, and society and on the skills needed for the investigation, evaluation, and citizenship responsibilities associated with science-related social issues.



Description

STSIS provides training in the investigation and participation skills needed by a scientifically literate citizen. Following an introduction to science-technology-society interactions, the program prepares students to conduct investigations into issues related to those interactions in their own community or region. Science-technology-society issues, for example, include controversies over transportation safety, medical procedures, use of animals in research, zoning, or development decisions. Environmental issues, such as solid waste management, use of wetlands, asbestos in the workplace, and endangered species are also examples of issues students might choose to investigate. The program develops skills in information processing, problem solving, and decision making, and promotes positive citizenship behavior among students.

Eighth graders in the program tested significantly higher on a post-instruction test using the Iowa Test of Basic Skills in both science and social studies than did students in a comparison group receiving traditional instruction. Students involved in STS received higher scores than comparison students on measures of overt citizen behavior, individual locus of control, group locus of control, knowledge and perceived knowledge of citizen action skills, and perceived skill in the use of citizen action skills. STSIS is approved by PEP for grades 6–8.

Requirements

Teachers must be trained in the model. Inservice training consists of a minimum of 6 days. Each participating student must have a consumable worktext. It is highly recommended that participating schools develop a library of issue-related video tapes, articles, and books.

Costs

Training costs for a group of 30 teachers include two trainers at $250/day/trainer, for 6 days, plus expenses. Assuming a 100 student load for each teacher, start-up costs are $10–$12/student. Continued operating costs are $9–$10/student/year for annual purchase of the consumable student worktext.

Services

- Training and consultation are available.
- Student consumable worktexts are available for purchase.

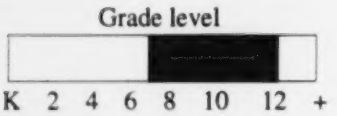
Contact

Harold Hungerford or Trudi Volk
Science and Environmental Education Center
Department of Curriculum and Instruction
Southern Illinois University
Carbondale, IL 62901
618–453–4211 or 453–4214

Developmental funding: Private
PEP No. 93–12 (3/26/93)

Science-Technology-Society: Preparing for Tomorrow's World (PFTW)

A multidisciplinary approach to problem solving and critical thinking to promote decision-making and problem-solving skills needed to deal with issues in science, technology, and society.



Description

In our increasingly complex technological world, issues and problems also become increasingly complex. Students need more sophisticated problem-solving and decision-making skills to deal effectively with current and future societal issues. The goals of PFTW modules are the development of logical, higher level thinking and social reasoning skills in the context of science, technology, and society. Serving as the guiding framework for the materials, activities, and teaching strategies, a sound instructional model is used to develop the skills necessary for students to move to higher levels of cognitive reasoning and citizenship. Designed to directly relate to National Goals for Education 3 and 4 related to citizenship, problem solving, and higher order thinking.

PFTW is comprised of a set of four independent curriculum modules. Topics covered include the following:

- Coastal Decisions
- Space Encounters
- Beacon City: An Urban Land-Use Simulation
- Decisions (a 12-topic, cross-discipline "sampler" module)

PFTW engages students in activities such as scenario writing, graphing, problem solving, conducting surveys, and futures forecasting, to add another dimension to existing curricula. Discussion and debate among students encourage critical self-evaluation and promote more complex reasoning ability and increased perspective-taking abilities. Depending on the modules selected and the course structure in which they are used, activities may be used in continuous sequence, interspersed throughout existing courses, or, as in the senior high grades, taught as discrete units of study. The program is approved by JDRP for all students, grades 7–12.

Contact

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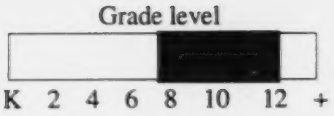
Developmental funding: USOE ESEA Title IV–C
JDRP No. 81–10 (12/15/81)

Sci-Math

A curriculum model bridging the abstract operations taught in mathematics and their applications in the introductory sciences.



Description

Sci-Math links the problem-solving skills used in mathematics with those needed in the sciences and in everyday life. Using the mathematics of rates and ratios, it enables students to build a tool chest of problem-solving and reasoning strategies they can apply to the sciences, social studies, home, and business. It is ideal for teachers whose students say they cannot do story problems because they just do not know where to start. Sci-Math promotes the National Goals for Education to increase student achievement in mathematics and science and to strengthen mathematics and science education.

Central theme. The technique of factor analysis is presented in discrete steps that build students' confidence in their problem-solving abilities. Sci-Math emphasizes essential problem-solving habits: to stay on track and find what a problem really asks for, to remember the importance of labels for data and answers, and to think of problem solving primarily in terms of relationships, not arithmetic calculations.

Applications. Teachers can easily use Sci-Math as a mini-course, a supplement, or a parallel course. It works well in cooperative learning environments. Advanced students of algebra, chemistry, or physics can assimilate the core program ideas in as little as 2 weeks; for less advanced or younger students, teachers may spend 3–6 weeks, depending on the skill level they want to achieve. Teachers should note Sci-Math does not expand the curriculum; rather, Sci-Math extends it by showing students new and efficient ways to solve the problems they already face.

Activities. More than 20 hands-on activities and experiments deal with situations at home, school, and business that are already

familiar to students. Activity materials, such as rulers, string, and pressure gauges, are readily available and inexpensive.

Materials. Two editions of *Sci-Math: Applications in Proportional Problem-Solving* are available from Addison-Wesley. Module One is best suited to pre-algebra students; Module Two assumes familiarity with algebraic variables, graphing, and charting. Teachers' guides are available for each module. The guides also provide record sheets, data, and answers to questions. Student texts cost about $8/copy and are reusable. In addition, workshop participants receive numerous free worksheets and exercises.

On a validated criterion reference test, students of varying ability in grades 7–12 demonstrated significantly positive growth in proportional problem-solving skills. Sci-Math is approved by JDRP/PEP for grades 7–12. It embraces mathematical techniques that can be usefully assimilated by students of varying age and ability, from low achievers and the educationally disadvantaged to college-bound high school students in math, chemistry, and physics classes.

Requirements

Teacher training consists of one 6-hour workshop that focuses on Sci-Math Module One. Participants should bring a Module One teacher guide and student book to the workshop. Workshop sponsors cover the cost of Addison-Wesley texts and the trainer's fee and expenses.

Services

- Awareness materials are available at no cost.
- Program personnel are available for 1-hour awareness presentations when expenses are covered.
- Training costs are trainer's fee plus travel expenses, and $16/participant (typically 20 people) for workshop materials.
- Duplication expenses are $5/student each year. Program adopters receive follow-up assistance by phone or mail, and our newsletter, *The Sci-Math Way*, free.

Contact

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Sci-Math Education and Technology Foundation
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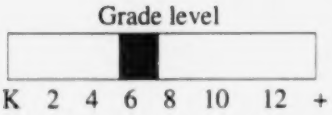
Developmental funding: National Science Foundation
JDRP No. 82–20 (5/12/82) Recertified 6/86

Skills Reinforcement Project (SRP)

A program to improve the reasoning ability and mathematics achievement of talented minority and low-income students.



Description

SRP uses a diagnostic-prescriptive approach to mastery learning in an accelerated mathematics curriculum. The approach allows students to proceed at a flexible pace as new concepts and skills are mastered. Students work individually and in groups. The curriculum itself includes elementary arithmetic concepts and skills, more advanced skills, pre-algebra, and algebra. Supplemental program components include parent education and counseling, affective development (attitude, motivation, and discipline), and a supplemental language arts instruction to help students better understand and solve mathematical problems. SRP is ideally a 2-year, 220-hour intervention consisting of 20 3-hour Saturday sessions during the academic year and a 2-week summer residential program at a college campus. During the summer program, students are supervised and mentored by minority college students hired as residential assistants. The goals of the program are to increase student participation in higher level mathematics classes and in turn enable them to select college majors and careers in mathematics and science.

After completing the program, the majority of students moved up substantially in percentile rank on both achievement and aptitude tests, with more students scoring above the 90th percentile after completion of SRP than before. Greater gains were made by students participating in the program for a full 2 years rather than a single year. Effect sizes for pre-post contrasts ranged from one to two full standard deviations. The program is approved by PEP for students in grades 5–7.

Requirements

Staff requirements include: site director and one resident assistant/10 students (summer component); one teacher/20 students, one teaching assistant/teacher (Saturday and summer component). With careful preselection of staff, training requires no more than 1 week during the academic year, the program requires classroom space and during the summer, access to a local college or university campus. Instructional materials include textbooks and project publications.

Costs

Start-up costs are largely determined by the costs of staffing the program. Training costs $5,000 for start up and $2,000 to operate the program. Materials and supplies cost $4,000 initially and $2,500 to operate the program. Total costs are estimated to be between $46,500 and $65,000 for a group of 45 students, and between $1,033 and $1,444/student.

Services

- All aspects of the project are described in published papers.
- Curriculum guides, teacher training materials, teacher, parent, and student handbooks, as well as an administrator's handbook on how to develop an SRP, are printed and available.

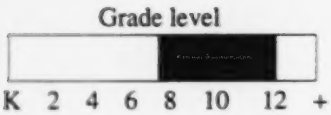
Contact

Ms. Elizabeth Stork
Skills Reinforcement Project
Center for Talented Youth
Johns Hopkins University
520 East Wilson Avenue, Suite 120
Glendale, CA 91206
818–500–9034 FAX 818–500–9058

Developmental funding: Private foundations
PEP No. 93–4 (2/10/93)

Sound Foundations

A program to improve the achievement and attitude of high school remedial mathematics students by presenting concepts in the context of topics of interest to the age level.



Description

Sound Foundations replaces the traditional mathematics curriculum for the target students but retains the traditional textbook for student practice. The program covers topics in the remedial mathematics program by using a simulation format. Major topics include integers, rational numbers, graphing, measurement, geometry, probability, statistics, and consumer mathematics.

The program is divided into 10 milestones in a job simulation about a rock band: formation, equipment purchase, rehearsal, dance clubs, record sales, airplay, publicity, local concerts, away concerts, and the national tour. Students are given a budget of $41,000 and must use creativity, management skills, and mathematics concepts to successfully guide the band financially. Managers receive quality points based on their decisions. Students learn new mathematics topics as they are needed in the simulation and work independently of one another.

The program includes a student book, teacher's manual, 5 decks of activity cards, 111 daily quiz masters, transparency masters, and test masters. An annual exchange of ideas occurs every fall in a newsletter circulated to users of the program.

Remedial mathematics students using the program show a greater increase in mathematics achievement and a positive increase in attitude towards success in mathematics, learn not to stereotype mathematics as a male domain, and elect more quantitative courses in high school. Female students demonstrate a more positive attitude toward the usefulness of mathematics. Use of the program has increased the percentage of students passing state competency tests required for graduation and has increased the percentage of students taking mathematics electives. The program is approved by PEP for students and teachers in high school remedial, general, and

basic skills mathematics programs. Junior high schools and middle schools may also use the simulation in their programs in grades 7–8.

Requirements

A training workshop is required. A careful mix of structure and informality is also encouraged in the classroom.

Costs

Costs for the program are $11 for a teacher's envelope (that lasts for years), $10 for a student book (that is consumable), and $5 for a teacher's manual.

Services

- Awareness materials are available at no cost.
- An annual newsletter, *Feedback*, that serves as a network for users, is available at no cost.

Contact

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North Shore High School
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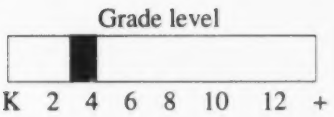
Glen Head, NY 11545
516–671–5500

Developmental funding: Local
PEP No. 90–05 (2/6/90)

Starwalk

A comprehensive Earth-Space science program for elementary students.



Description

Starwalk provides instruction in Earth-Space science concepts to grades 2–5. Students receive a series of classroom lessons and activities structured around visits to a planetarium facility. Classroom lessons are designed for both before and after planetarium visits to prepare students for their activities at the planetarium and to consolidate and further the learning after the visit. Planetarium and classroom teaching guides provide the instructional materials for the lessons.

The program is approved by JDRP for grades 3–4.

Requirements

The availability of a planetarium facility, either fixed-base or portable, is required. Classroom materials are minimal, but should include an earth globe, celestial sphere, and earth-sun model. Recommended classroom instructional time is about 12 hours per level, including the planetarium lesson. Inservice training requires 2–5 days depending upon the implementation situation.

Services

- Awareness materials are available at no cost.
- Developer or certified trainers are available for awareness presentations or implementation training.
- All costs are paid by adopter.
- Training can be conducted at the adopter or program site and is available throughout the year.
- Implementation follow-up services are available.
- Additional grade-level materials are available for grades 2 and 4.

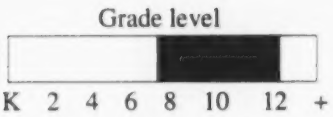
Contact

Bob Riddle
Starwalk
Southwest Science/Math Magnet High School
6512 Wornall Road
Kansas City, MO 64113
816–871–0913

Developmental funding: Title IV–C, state, and local
JDRP No. 83–9 (3/4/83)

Stones and Bones

A laboratory approach to the study of biology, modern science, and anthropology to enrich the present modern or life science, biology, and physical anthropology courses.



Description

Stones and Bones meets the needs of all ability students. The format is interdisciplinary and emphasizes active student participation through laboratory explorations. Modern (general) or life science and biology instructional units supplement, enrich, and extend current science curricula. Three instructional pathways emphasize the study of humankind.

Modern (General) Science Pathway. Designed to motivate noncollege-oriented students. Each of the 20 laboratory explorations offers the general science student "hands-on" opportunities to investigate topics such as geologic time, measuring radioactivity, mapping, behavior of primates, and hominid changes through the use of replica casts of fossil hominids.

Biology Pathway. A 4–5-week overview of physical anthropology. The unit provides students with "hands-on," in-depth experiences as a supplement to physical anthropology in biology textbooks. A series of 11 investigative explorations focuses on topics including primate behavior and distribution, interpreting archeological records, primate locomotion and morphology, and changes in human development through the use of replica casts of fossil hominids. This approach reinforces and extends many basic concepts taught in the study of biology.

Semester Course Pathway. This pathway in physical anthropology provides students the opportunity to study early origins of humankind in depth. Laboratory investigations pursue such topics as phylogeny through time, continental drift, locomotion and behavior of primates, molecular-revolution, and the beginnings of spiritual awareness. Some 14 fossil replica casts of Australopithecus, Homo Erectus, Neanderthal, and Cro-Magnon are used in these explorations.

The program is approved for science students of all ability levels, grades 7-12.

Contact

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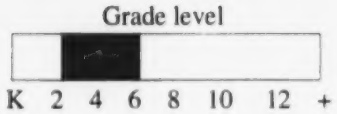
Director of Professional Development
450 North Grand Avenue
Los Angeles, CA 90012

Milton Anisman, Disseminator
Physical Anthropology Center
6625 Balboa Boulevard
Van Nuys, CA 91406
818–997–2389

Developmental funding: USOE ESEA Title IV–C
JDRP No. 82–29 (5/26/82)

Success Understanding Mathematics (SUM)

A comprehensive mathematics program for students of all ability levels using concrete objects and questioning techniques to increase achievement of those performing below expectations.



Description

SUM was designed to increase the level of mathematics achievement of children who were achieving below the level expected. The program materials and teaching techniques are appropriate, however, with students of all ability levels. Direct instruction is emphasized to facilitate student interaction in their development of concepts. Teaching strategies described in program manuals are based on Jean Piaget's research about the way children learn mathematics, specifically elementary school children's difficulty with abstract thought and their consequent need for concrete materials. Teachers guide students to develop mathematics concepts as students move objects to solve problems. Computational algorithms are developed through recording the action. Drill follows but does not precede understanding. Some unique characteristics include the following:

- Program materials can be used with any commercial text.
- Planning for instruction is matched to student needs.
- Objectives for mathematical skills include a problem-solving strand.
- Criterion-referenced tests for the objectives and record-keeping materials are available.
- Parent involvement and an ongoing inservice program provide support for teachers.

Teachers who participate in SUM workshops learn techniques for strengthening mathematics education in the elementary grades. SUM program teaching methods match those recommended in *The Curriculum and Evaluation Standards* published by the National Council of Teachers of Mathematics. Students learn to think and communicate mathematically as they use manipulatives in a problem-solving approach.

Chapter 1 students have made proven advances measured by the mathematics batteries of the Metropolitan Achievement Test and the Iowa Test of Basic Skills. Mean annual gains scores have ranged from 6.6 NCEs (Normal Curve Equivalency) to 13.0 NCEs. The program is approved by JDRP for grades 2-6. It also has components in use with grade 1.

Requirements

The program may be used by a teacher, school, supplementary program, or an entire district. Adopters will be invited to visit a demonstration site, to name a local program coordinator-contact person, to provide release time for teachers and administrators to participate in 1 or 2 days of preservice training, to ensure the key elements including the teaching strategies and ongoing inservice will be implemented, to evaluate student achievement, and to provide information about the adoption.

Services

- Awareness materials are available at no cost.
- Program publications are furnished to adopters at cost.
- Visitors are welcome anytime by appointment at the program site.
- Program staff are available to attend awareness meetings.
- Training is available at the program site or adopter site (costs to be negotiated).
- One day of preservice training is required; 2 days of preservice training is preferred.
- One or 2 days of follow-up implementation training scheduled 3–4 months later and a 1-day, on-site follow-up visit at year end are recommended (costs to be negotiated).

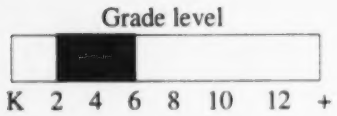
Contact

Kathleen Bullington, Director
Success Understanding Mathematics
Des Moines Public Schools
1800 Grand Avenue, Room 343
Des Moines, IA 50309
515–242–7860

Developmental funding: USOE ESEA Title I
JDRP No. 80–55 (2/11/81) Recertified 1/85

Successful Inservice Through Turnkey Education (SITE)

An inservice program for elementary school teachers and supervisors for the development of higher level thinking skills through the use of manipulative materials.



Description

The SITE program is based on a problem-solving approach to learn new mathematical concepts and skills. The program integrates content and methodology, using hands-on activities with a variety of manipulatives. Since teachers "teach as they were taught," the program uses processes and activities that are immediately applicable in the classroom as the instructional model activities are readily integrated with existing math curriculum and mesh with every textbook. SITE addresses all 13 of the K–4 and 12 of 13 of the 5–8 NCTM Standards for Curriculum and Evaluation. Mathematics content (fractions, decimals, area, perimeter, volume, metric measure, graphing, geometry) is presented through a process approach (cooperative grouping, questioning strategies, guided discovery). The program provides the printed materials as well as mathematics equipment needed in the classroom.

SITE may be adopted at one of two levels:

- *Direct Training for Classroom Teachers.* (15–25 hours over 3–4 days). This includes mathematics content and teaching strategies described above. Teachers use the SITE program with students.
- *Training the Trainer.* After 1 year of classroom use, selected participants receive 6–12 hours of additional instruction, focusing on training skills (i.e., workshop organization and leadership, brain dominance and learning styles, and the psychology of the adult learner). They then act as turnkey trainers for other teachers in their schools or districts while they continue to use the SITE program.

Evaluation is continuous from initial training through classroom use. Effectiveness has been demonstrated in urban, suburban, and rural schools. Teachers' mathematical knowledge increases substantially, while enthusiasm and skill in teaching math is noticeably enhanced. Student growth in knowledge from pre- to

posttest has been significant (at 0.05 level). SITE is approved by JDRP for elementary school teachers and supervisors (grades 2–6) and students of these participants.

Requirements

The program can be adopted by a district, school, or teacher. *Classroom Team Adoption* is a minimum of 3 full days of SITE training; classroom use with students for 2–40 hours; and pre- and posttesting of students. *Turnkey Adoption* is a minimum of 3 full days of SITE training and 1 full day of Training the Trainer; turnkeys conduct SITE inservice for other school or district teachers totaling 10–15 hours; classroom use with students by each trained teacher for 20–40 hours in the classroom; and pre/posttesting of students.

Costs

Direct training for classroom teachers—honorarium, travel, and per diem costs for SITE trainer(s): $60/participant for workshop materials; one SITE Starter Kit for each adopting building: $415, includes shipping and handling. Training the trainer—honorarium, travel, and per diem costs for SITE trainer, $30/participant for workshop materials.

Services

- First-level awareness materials are available at no cost.
- Visitors are welcome by appointment at the demonstration sites in East Meadow and New Rochelle, New York.
- Program staff are available to attend out-of-state awareness meetings (costs to be negotiated).
- Training is conducted at the adopter site.
- Implementation and follow-up services are available (costs to be negotiated).

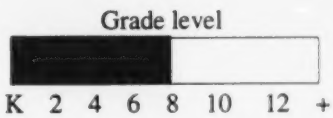
Contact

Dr. Barbara Berman or Dr. Fredda J. Friederwitzer
Co-directors, SITE, Educational Support Systems, Inc.
446 Travis Avenue
Staten Island, NY 10314
718–698–3636 FAX 718–370–3102

Developmental funding: USOE Metric Education Program
JDRP No. 82–27 (5/27/82) Recertified 6/5/86

Systematic Teaching And Measuring Mathematics (STAMM)

A comprehensive, outcome-based mathematics program resulting in high student achievement.



Description

STAMM presents an elementary mathematics program that covers the curricula and the means necessary to assist in delivering NCTM's "Standards." Teachers can select from a variety of learning activities to provide for the needs of their students through a variety of concrete manipulatives, practice, problem-solving, and enrichment strategies. The program provides students with varied opportunities to develop underlying concepts, and can be used in a variety of teaching styles (large group, cooperative grouping, departmentalization, individualized or labs). The flexible design fits into schools of all sizes and classroom structures. It includes a management system organized around carefully designed learner outcomes. Student growth is monitored through postassessment strategies. The program is approved by JDRP for students of all abilities, grades K–8.

Requirements

The program is delivered through the following STAMM materials: Teacher Manual (TM)—a resource book of *activity*-oriented ideas to assist the teacher in delivering the learner outcomes; Student Booklet—a set of student materials from which a teacher selects activities as needed to enhance development and practice of the learner outcomes by the students *after* they have received initial instruction; and Student Assessment Booklet—criterion-referenced assessments to provide information about the student's progress on the learner outcomes using alternative testing strategies. These STAMM resource materials have been created to complement the existing textbooks, manipulative materials, and teacher-made resources.

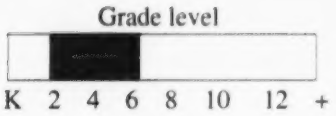
Contact

Larry Bradsby
Director, STAMM
Jefferson County Schools
1829 Denver West Drive
Golden, CO 80401
303–273–6630

Developmental funding: USOE ESEA Title III
JDRP No. 76–87 (6/23/76) Recertified 12/84

Systems Approach to Individualized Instruction (SAII)

A systematic instructional program in reading and mathematics.



Description

SAII has developed criterion-referenced tests and learning modules for 155 reading skills (e.g., readiness, phonics, syllabification, and structural analysis) plus 200 criterion-referenced tests and learning modules for the computational skills of mathematics.

The program has also developed sets of teacher questions and student worksheets to accompany over 400 paperback books (e.g., *Profiles in Courage, Henry Huggins, Little Red Hen*). Each set of questions has been divided into lessons with each lesson having questions on five levels of comprehension: recall, interpretation, extrapolation, analysis, and evaluation. A set of two handbooks is available to help the teacher manage the component parts. The program can be adapted to the areas of diagnosis (criterion-referenced—mathematics and reading) or basic skill development (learning modules in reading and mathematics comprehension components of reading). SAII is approved by JDRP for students of all abilities, grades 1–6. It has also been used in other settings with grades 7–8.

Requirements

A 1–3-day preadoption workshop is required. Consultant help is available. SAII is used by the regular classroom teacher. The reading component requires two teachers, the mathematics component, one. Master tapes—available for reproduction—are required for the reading component.

Costs

Print-ready sets of program materials are available at cost. Diagnostic tests: reading, $20; mathematics, $24. Learning modules: reading, $70, mathematics $120; comprehension questions, $165; games to go with reading learning modules, $20.

Services

- Awareness materials are available.
- Visitors are welcome October–March.
- Training is conducted at the program site (adopting site must cover own costs).
- Training is conducted out of state.
- Program staff can attend out-of-state conferences.

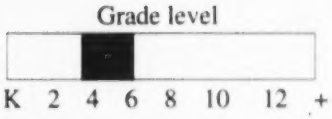
Contact

Charles L. Barker
Josephine County School District
PO Box 160
Murphy, OR 97533
503–862–3111

Developmental funding: USOE ESEA Title III
JDRP No. 73–15 (4/4-5/73)

Team Accelerated Instruction (TAI): Mathematics

A program using group instruction that improves motivation toward mathematics.



Description

TAI: Mathematics is a program that helps teachers meet the diversity of student needs within the mathematics class. It combines quality interactive instruction with the power of cooperative learning to accelerate the achievement of all students, maximize teaching and learning time, enhance motivation and attitudes toward math, and improve students' social interaction. Students receive concept instructions from the teacher in small homogeneous teaching groups. They then practice the skills learned in four to five member heterogeneous learning teams at their own pace on materials appropriate to their specific needs.

The instruction is organized into 13 paperbound, nonconsumable student books. Each classroom set of books contains a range from advanced addition to pre-algebra. The program also includes comprehensive teacher materials that make it easy for teachers to plan, teach, and manage the mathematics program effectively.

TAI has proven effective in five field experiments that involved random assignment of classes to TAI or control treatments. Differences between TAI and control classes in grade equivalent gains on the Comprehensive Test of Basic Skills Mathematics Computations had a median ratio of more than two to one. The program was developed by R.E. Slavin and colleagues, and is approved by the JDRP for grades 3–6.

Services

- Awareness materials are available at no cost.
- Training is 1–2 days; follow-up advisable (costs to be negotiated).

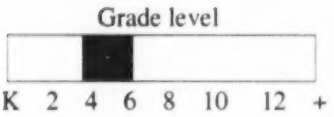
Contact

Barbara M. Luebbe
Director, TAI
Center for Social Organization of Schools
The Johns Hopkins University
3505 North Charles Street
Baltimore, MD 21218
410–516–0370

Developmental funding: NIE and OSE
JDRP No. 84–5 (3/23/84)

Title I Mathematics Computer Assisted Instruction (CAI)

A diagnostic-prescriptive, pull-out mathematics program with students receiving 10 minutes of daily concentrated drill.



Description

Lafayette Parish had an effective diagnostic-prescriptive mathematics ESEA Title I pull-out program. To increase growth in mathematics, computer-assisted instruction was added to an already effective mathematics program. The program is operated with close coordination of math-lab instruction and daily CAI drill. One day a week, a Chapter 1 coordinating teacher provides individual instruction, when needed. The CAI program adjusts instructions to the level of the students and provides immediate feedback to the student. It provides daily, weekly, and monthly descriptions of progress and areas of difficulty that the classroom teacher can use to correct specific conceptual misunderstandings.

Classroom instruction is imperative in providing conceptual understanding and remediation. Daily CAI drill provides the practice Chapter 1 students especially need. This particular program was operated with 40 minutes a day of mathematics laboratory time and 10 minutes of CAI. Presently, it operates with 10 minutes a day of CAI and the services of a coordinating teacher 1 day a week. The particular program was devised by Computer Curriculum Corporation (CCC) of Palo Alto, California. The addition of CAI instruction produces significantly superior achievement when compared to standard mathematics laboratory instruction. The program is approved by JDRP as a mathematics program for Chapter 1 students in grades 3–6.

Requirements

Math Lab-CAI can be adopted to supplement any regular program if 200 students are enrolled. Two to 3 days of inservice training are necessary. The program used Computer Curriculum Corporation Programs from Palo Alto, California, and correlation between your program and CCC must be established.

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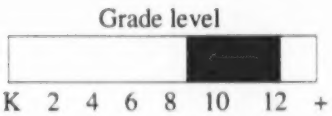
Developmental funding: USOE ESEA Title I
JDRP No. 82–46 (9/29/82)

Utilizing Computers In Teaching Secondary Mathematics (UCTSM)

A program of microcomputer-based instructional materials and techniques to improve mathematics skills.



Description

UCTSM's goal is to improve mathematics skills through the use of microcomputer-based instructional materials and techniques. The program's package consists of two teachers' manuals and six disks (for TRS–80 or Apple II computers) containing about 70 computer programs that encompass six areas of secondary level mathematics—Algebra I and II, Geometry, Trigonometry, Calculus, and Applied Mathematics. While some programs are tutorial in nature, others are drill and practice or simulations using graphics. The programs can easily be integrated into any traditional mathematics curriculum without the need to hire any additional staff.

UCTSM addresses Goals 3 and 4 of the National Goals for Education by providing instruction and practice for students of all ability levels to increase their performance in mathematics. The program is approved for grades 9–12.

Services

- Awareness materials are available at no cost.
- Training is available at the adopter site (all expenses, plus trainer's fee must be paid).
- Implementation and follow-up services are also available to adopters (trainer's fee and expenses must be paid).
- A fee of $150 is charged for the teachers' manuals and computer programs that are available.

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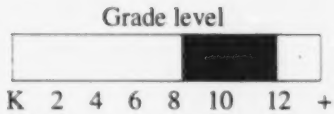
Developmental funding: USOE ESEA Title IV–C
JDRP No. 82–17 (4/29/82) Recertified 6/18/86

Videodisc-Based Instruction in Core Science Concepts

An instructional system using videodisc technology to enhance science teachers' ability to reach diverse learners.



Description

With the aid of a videodisc player, a teacher engages students in stimulating discussion, demonstrations and individual work to learn challenging earth science and chemistry content. Teachers closely monitor student learning and reteach concepts to students needing additional direct instruction.

The program is built around the following three major strategies: maximizing learning time for the most important subject matter; involving students intensively in learning coupled with close monitoring of student progress and adaptation of teaching to prevent student failure; and organizing pedagogy and content stressing important, generalizable concepts and problem-solving strategies applicable to all students.

Students of diverse ability levels enrolled in the videodisc program achieved comparable gains in knowledge of core chemistry concepts to gains made by students in an Advanced Placement chemistry course. Students of diverse ability levels enrolled in the videodisc program achieved substantially greater earth science knowledge, generalization and problem solving skills than did students in a traditional earth science course. The program is approved by PEP for students in grades 8–12.

Requirements

An initial 2-hour training for teachers is required, along with a follow-up visit with the teacher using the curriculum within 2 weeks after initial training. Schools must purchase a videodisc player, videodiscs for the Earth Science and Understanding Chemistry and Energy programs, teachers' manuals, student workbooks, release of copyrights to allow reproduction of the student workbooks, and staff development videotapes.

Costs

Costs are about $5,000/building.

Services

- Training
- Videodisc programs
- Student workbooks
- Teacher training materials

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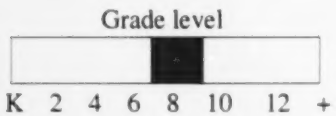
801–750–3718

Developmental funding: USDE, Office of Special Education and Rehabilitative Services, state, local, and other sources
PEP No. 92–9 (3/26/93)

Wildlife Inquiry Through Zoo Education (W.I.Z.E.)

A life sciences program to improve understanding of concepts related to population, ecology, wildlife conservation, and species survival.



Description

Combining classroom study with the unique scientific resources available at zoos, W.I.Z.E. explores wildlife survival in the 21st century. Using a multidisciplinary approach, cooperative learning techniques, and hands-on activities that encourage decision making, W.I.Z.E. teaches that animals are members of populations that interact with one another and ecological processes affecting animals also affect humans. Averaging 15-20 weeks of instruction, the program includes three visits to a local zoo (or one if access to a zoo is difficult).

Using highly motivating activities, multimedia materials, small-group discussions, zoo visits, and a role-playing activity, students are exposed to the scientific method and develop problem-solving skills. W.I.Z.E. educates young people to approach difficult problems analytically and make decisions based on informed perspectives. It can serve on its own or as a supplement to an existing life science or environmental education program.

W.I.Z.E. addresses National Goals for Education 3 and 4. By exercising students' analytical and writing skills, it prepares them to take responsible proactive roles in their communities. Grade 7–9 students participating in W.I.Z.E. for a period of 12–15 weeks scored significantly higher on a reliable locally developed test of life science concepts than did a control group. This claim is based on an experimental and comparison group study of 15,000 students in 13 states. Students participating in W.I.Z.E. also scored significantly better than the control group on two scales measuring mastery of specific science skills and knowledge areas taught in the W.I.Z.E. curriculum. The program is approved by PEP for all students, grades 7–9.

Requirements

No special facilities are required within the school. Access to a zoo, natural history museum, nature center, or wildlife area is

recommended. Training is encouraged for optimal use. Curriculum and learning materials include 34 student resource books; 6 sets of 24 illustrated discovery cards; 22 photo cards; 41 worksheet masters to go with lessons; 136-page Teacher's Manual; 2 sound cassettes; 96-frame filmstrip; and Posterity: A wildlife management game.

Costs

Teachers must purchase a *Survival Strategies* classroom kit from Beacham Publishing at a cost of $325. Usually, one kit per school is sufficient. A kit provides all the necessary materials for a class of 34 students. Beacham Publishing offers bulk discount rates for districts that order more than three kits. Training fee is $155/day plus travel expenses. Two- to 5-day training options are available.

Services

- Program staff are available to attend out-of-state awareness meetings.
- Two- to 5-day training options are available in requesting districts and states throughout the year.
- Follow-up assistance is also available.

Contact

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or
Donald Lisowy, W.I.Z.E. Dissemination Coordinator
Bronx Zoo, New York Zoological Society
185th Street and Southern Boulevard
Bronx, NY 10460
718–220–5135 or 800–937–5131

Developmental funding: National Science Foundation
JDRP No. 86–6 (4/9/87)

Junior high school students observing and recording primate behavior at the Bronx Zoo in the Bronx, New York. © NYZS/The Wildlife Conservation Society.

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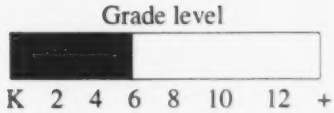
Zoo Opportunities Outreach (ZOO)

A series of curriculum materials related to the study of animals to supplement and enrich existing classroom programs through experiential learning.



Description

ZOO is a science-oriented animal studies program that offers varied multi-sensory and multimedia learning experiences to augment zoo field trips. While children explore the world of animals and learn about conservation and ecology, activities are introduced in which students experience not only science, but aspects of language, mathematics, social studies, music, and art.

Through the use of nearly 300 program-developed materials, six units of study are explored: *Animal Characteristics, Animal Behavior,* and *Animal Homes and Habitats* for primary grades; and *Classification, Adaptation, and Interdependence* for the intermediate grades. Study prints, flash cards, student booklets, worksheets, and games make the program an interesting and successful experience, stimulating more self-direction and causing more positive personal interaction.

The materials accommodate any learning style and have proved effective even though a trip to the zoo is not possible. The teacher's unit book contains background and introductory information, activity suggestions, and a bibliography of resources. This manual, along with all needed materials, comprises a teaching kit. Materials include worksheet activities such as crossword puzzles, word-search games, and matching items that can be enlarged for posters or games. These materials were created by teachers to reflect teacher needs and can be used in regular classroom programs. A sample kit of materials is available for review.

During development, students in program classrooms were compared with students in similar control classrooms through use of unit tests. Experimental students gained significantly more than comparison students in their knowledge and understanding of the concepts and processes of each of the six program units.

The program is approved by JDRP for K–6 students of all abilities.

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Developmental funding: USOE ESEA Title IV–C
JDRP No. 81–18 (9/17/81)

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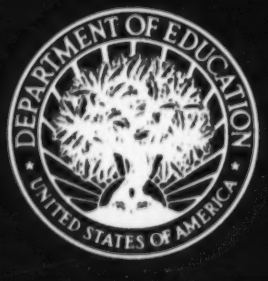

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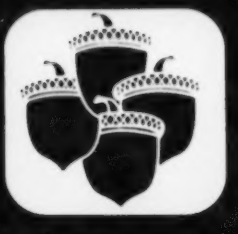

Programs for the Improvement of Practice
PIP 94–1307

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